AMSTRAD COMPUTER USER

ACU

JANUARY 1991

£1.45

COWABUNGA

Take Shredder to the cleaners in Image Works' awesome Turtles blast.

STAR CURSING

The indestructable joystick has landed. Are we serious? You bet!

GLITTERING PRIZES

A fantastic Turtles video AND an incredible video recorder must be won!

COSTING FOR PROFIT

Essential utilities from ABC Software to help your business grow.




AMIGA - ATARI ST - PC / PS - AMSTRAD CPC / CPC+ / GX 4000 - C 64 - SPECTRUM
DICK TRACY
THIS TIME THEY'RE OUT TO GET HIM!
THE COMPUTER GAME
RETRACE THE STEPS OF DICK TRACY, THE WORLD FAMOUS COMIC STRIP DETECTIVE, IN THIS SUPERB COMPUTER CONVERSION OF THE BLOCK BUSTER MOVIE.
It's time to take on the mob which has sworn to get you! Grab that famous hat and coat and hit the streets in search of Big Boy Caprice and his gang. But watch out for their traps hidden around every corner. Choose your weapon track down the ugly mobsters and brace yourself for the fight of your life.
● 60 LEVELS OF RED HOT ACTION.
● STUNNING MOVIE STYLE SPECIAL EFFECTS.
● SUPERSMOOTH ANIMATION.
● SUPERB MUSIC INSPIRED BY THE FILM.
● REALISTIC FILM AND COMIC STRIP COLOURING.
Developed by:
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REGULARS

FEATURES

DATEL ELECTRONICS



dk'tronics

64K AND 256K MEMORY EXPANSION

- Simple plug in memory expansion gives instant extra memory.
- Features bank switching software for easy use by the programmer or for use as a data storage area.
- The software also features some extra BASIC commands.
- 64K unit expands 464 to 128K. The 256K unit takes your 6128 to 320K!!
- 64K unit brings 464 up to CPC 6128 memory configuration making a much larger software base available. Will work straight off with many programs designed for this unit (including OCP Art Studio - see Ad.).
- Ideal for use with the CPM 2.2 etc.
- Bank switching done automatically by software (cassette 464 - disk 6128).

ONLY £49.99 64K FOR 464

ONLY £99.99
256K FOR 464 OR 6128 (PLEASE STATE)

THE RAM MUSIC MACHINE IS PROBABLY THE MOST EXCITING MUSIC ADD-ON AVAILABLE FOR ANY COMPUTER

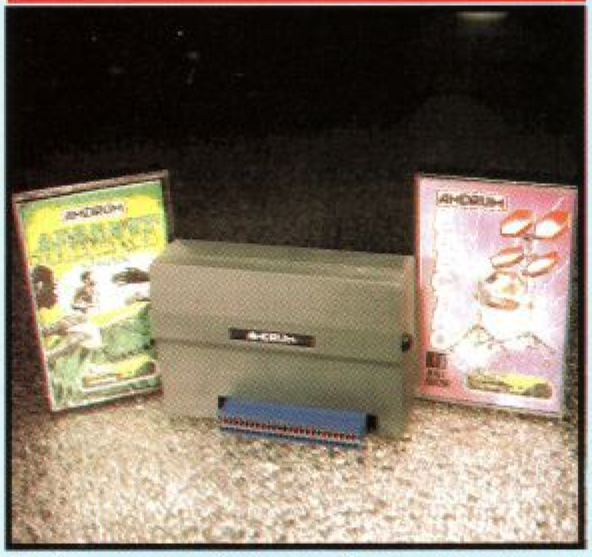


RAM music machine

- It's a full sound sampling system allowing any sound to be recorded digitally into the computer RAM. Once stored, the sound can be replayed at different pitches with many varying effects.
- It's an echo chamber & digital delay line. Create some very interesting effects.
- It's a two voice music/sound synth.
- The Music Machine can also be used as a drum machine - eight drum sounds are already provided for you, but you can easily produce more of your own.
- The extremely powerful software allows you to compose tunes from individual bars of music. You can edit your creations on screen & Save/Load sounds, instruments & rhythms.
- Fully MIDI compatible. The Ram Music Machine supports full MIDI In, MIDI Out & MIDI Thru.
- Output through your Hi-Fi or Headphones. Comes complete with microphone.
- Use a full size MIDI keyboard to play the Music Machine.
- Sounds produced by the Music Machine can be mixed with a MIDI synthesiser's own sounds.
- On screen Sound Editor can produce MIDI data from your own compositions.
- Various sampled sounds are provided in order to get you going.
- No other product can offer so much in one unit - it's the TOTAL SOLUTION!!

ONLY £49.99
FOR THE BEST MUSIC ADD-ON AVAILABLE FOR THE AMSTRAD

AMDRUM



- **Now you can turn your Amstrad into a real Digital Drum Machine.**
- AmDrum from Cheetah Marketing is a superb plug in device that produces "real" drum sounds via its unique digital system.
- On screen menu driven drum kit makes composing drum sounds easy for anyone to do!
- Just plug the output into your Hi-Fi, cassette player, etc. and that's it - your Amstrad is a drum kit!!
- Comes complete with DrumKit Sound plus extra DrumKit and Kit Editor Program (worth £9.99) absolutely FREE!!

ONLY £14.99

SPEECH SYNTHESISER & STEREO SOUND BOOSTER

- This easy to use Speech Synthesiser includes a powerful Stereo Amplifier and two pod speakers which are an enormous improvement on the sound supplied by the internal mono speaker.
- Speech output is monorial but directed to both speakers. Booster gives stereo to computer internal sound output.
- Using the SPO/256 Speech Chip the unit has almost infinite vocabulary.
- Text to speech software is provided in ROM to make speech output simplicity itself.
- Voicing is transparent to the user and the computer can carry on with other program tasks as necessary.



ONLY £29.99
464 OR 6128 (Please state which)

dk'tronics

LIGHTPEN/GRAPHICS SYSTEM

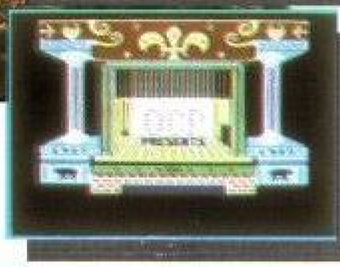


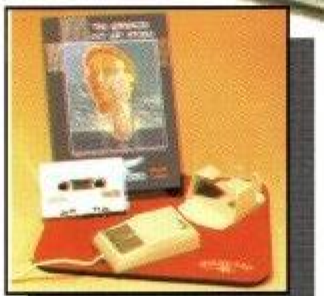
- Complete Lightpen and graphics system lets you create a whole range of effects on screen.
- It can magnify, shrink, colour fill and create circles, rectangles, lines and curves.
- Pictures can be edited at pixel level using a scratch pad which is magnified to a full screen.
- Picture storage and retrieval, and a pen calibration feature.
- Printer dump utilities for Epson/Amstrad printers supplied (on cassette).
- Complete package - no more to buy.

ONLY £14.99 CASSETTE
OR £24.99 WITH SOFTWARE ON ROM - NOTHING TO LOAD 464 OR 6128 (Please state which)

NOW A TOTAL MOUSE/GRAPHICS PACKAGE FOR YOUR AMSTRAD AT A TRULY UNBEATABLE PRICE!!







TAPE OR DISK FOR 464 OR 6128 (PLEASE STATE WHICH REQUIRED) N.B. 464 NEEDS DK'TRONICS 64K RAM PACK

Genius Mouse COMPLETE WITH OCP ADVANCED ART STUDIO

- **Genius Mouse is a high resolution two button mouse featuring optical counting, teflon guides, microswitches, rubber coated ball and high quality interface.**
- **When combined with OCP Advanced Art Studio this graphics package is quite simply the best system available. The features are unmatched...**
- Create an image - shrink it, expand it, move it, rotate it, copy it, colour it, etc., etc.
- Spray patterns or shades, make elastic lines - stretch and manipulate shapes.
- Zoom in to add detail in fine mode. ● Full cut and paste facilities plus excellent printer support.
- Pulldown/Icon driven menus for ease of use. ● Mouse operation, plus joystick and keyboard control.
- 16 pens, 8 sprays, 16 brushes - so flexible anyone can create superb graphics easily.



COMPLETE WITH MOUSE INTERFACE

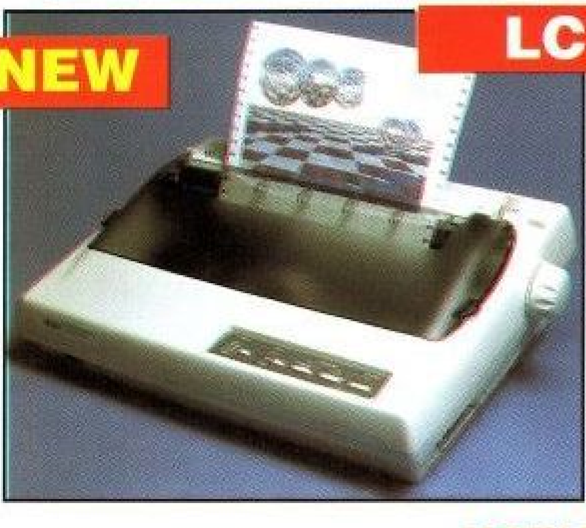


- The Genius Mouse Graphics System comes complete with the special Mouse Interface to allow super smooth control.
- Attractively styled to match your 464 or 6128 design and colour.
- Simply plugs into Expansion/Joystick port.

ONLY £49.99
TOTAL PACKAGE INCLUDES GENIUS MOUSE, INTERFACE, OCP ADVANCED ART STUDIO PLUS FREE MOUSE MAT AND HOLDER

FREE! MOUSE MAT AND MOUSE HOLDER (WORTH £12.99) WITH EACH PACKAGE

NEW LC 200 COLOUR PRINTER PACKAGE



NOW YOU CAN PRINT OUT YOUR PICTURES IN FULL COLOUR!

- The Star LC200 Colour Printer not only prints in Near Letter Quality for your regular jobs but also prints out your pictures from Art Studio, etc., in genuine colour!
- LC200 is a full Centronics printer so it works with other computers (Amiga, ST, etc.).
- Made possible by Datel's unique colour printer driver - now you can have a hardcopy in up to 16 colours!! ● No more to buy - just plug in and print!!

PACKAGE INCLUDES... STAR LC200 COLOUR PRINTER RRP £299.00
CENTRONICS PRINTER LEAD RRP £9.99
DATEL COLOUR PRINTER DRIVER SOFTWARE RRP £19.99
NORMALLY £327.98
COMPLETE PACKAGE NOW ONLY £239.00

COLOUR PRINTER DRIVER AVAILABLE SEPARATELY ONLY £19.99

- If you already have an LC10 or LC 200 Colour Printer we can supply the Driver separately.

HOW TO GET YOUR ORDER FAST...

TELEPHONE (24 Hrs) - 0782 744707 - CREDIT CARD ORDERS

WE WILL DESPATCH YOUR ORDER QUICKLY & EFFICIENTLY TO ENABLE YOU TO START RECEIVING THE BENEFITS OF YOUR PURCHASE WITHIN DAYS, NOT WEEKS. ORDERS NORMALLY DESPATCHED WITHIN 48 Hrs. ALL PRICES INCLUDE V.A.T. UK ORDERS POST FREE/EUROPE ADD £1/OVERSEAS ADD £3. PRICES AND SPECIFICATIONS CORRECT AT TIME OF PRESS AND SUBJECT TO CHANGE WITHOUT NOTICE. CALLERS WELCOME - Please reserve goods by telephone prior to visit. ALL CHEQUES/POSTAL ORDERS MADE PAYABLE TO...

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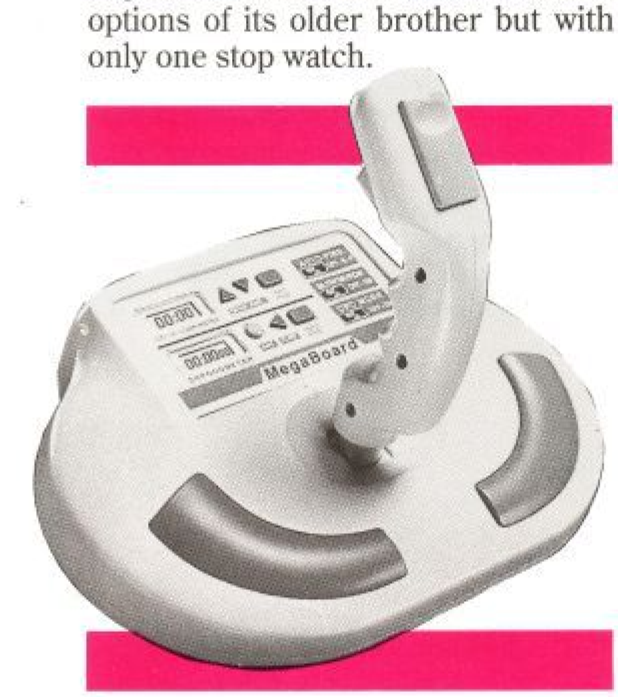
MEGA STICK

If you want to make the most out of your gameplay, Spectravideo reckons you won't go far wrong by getting hold of its new Mega Board.

For just £24.95, you get a highly responsive, heavy duty joystick with some excellent features to boot. The dual stopwatch allows you to keep a track of your best time and better it. It also allows two players to battle it out for victory.

Another extra-special function enables you to actually slow down your playing speed, making games much more challenging to seasoned gamesters, using a variable speed auto-fire.

If you think £24.95 is just out of your pocket money range, then try out the Super Board, which features all of the options of its older brother but with only one stop watch.

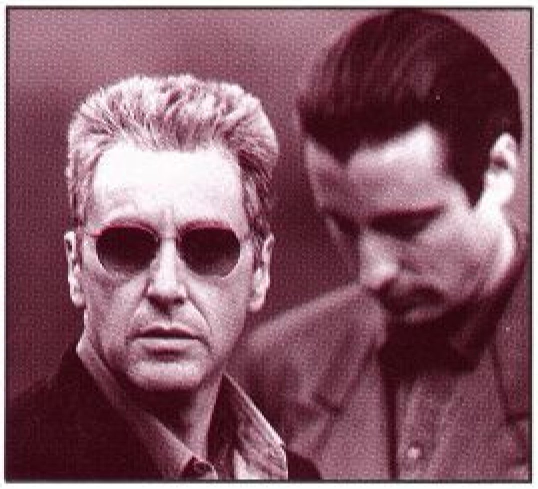


JOIN THE MOB

Watch out! The Mafiosa is coming to your computer screen in the form of US Gold's latest epic signing, The Godfather. Including the rights to all of the previous Godfather films, US Gold plans to produce more than one game to coincide with the release of the latest movie in the best-selling line, Godfather III.

There will be a high level interactive adventure game as well as an arcade style action blast to keep everyone happy, with the prospect of further games as sequels later on.

US Gold's George Brown said of the releases: "There are only a small number of absolutely recognisable licenses in the world and The Godfather is high amongst those. With the launch of the new film, the spotlight will be firmly on The Godfather and the products will be assured of success."



FAIR PLAY

If you still haven't completed your Christmas shopping list, then go along to the Christmas All Formats Computer Fair at the New Horticultural hall in Victoria, London. With huge discounts on everything from mouses to hard discs, games to printers, you're bound to find what you're looking for. The show takes place on December 15, so for that last minute bit of shopping, you know where to go.

CHARTBUSTERS

According to some of the latest figures from Gallup, Code Masters are sitting pretty holding the number one position in no less than six computer games charts.

Selling more games than any other publisher, the figures show that Code Masters actually sells 1 in 4 of every game going out of the shops, with only Ocean pushing ahead of them in the revenue stakes.

As the Codies themselves put it: "The message is clear...if you're not playing Code Masters, you're overlooking the biggest, most significant, most gorgeous, most hunky, fastest selling, exciting force in the leisure computing industry."

Fighting talk, what?

SHOPPING TIME

The massive Computer Shopper show starts today at the Wembley Conference Centre and if you're looking for that slight edge on the crowd, look no further.

With this super value voucher, you can get 50p off a ticket on any one of the four days of the show. Alternatively, use it to buy a family ticket and get an incredible £4 reduction at the door.

Just cut it out, take it along to the show and join in what looks to be the world's largest pre-Christmas computer shopping spree. There's something there for everybody and with this marvellous voucher, you've got even more of an incentive to get on down to the show.





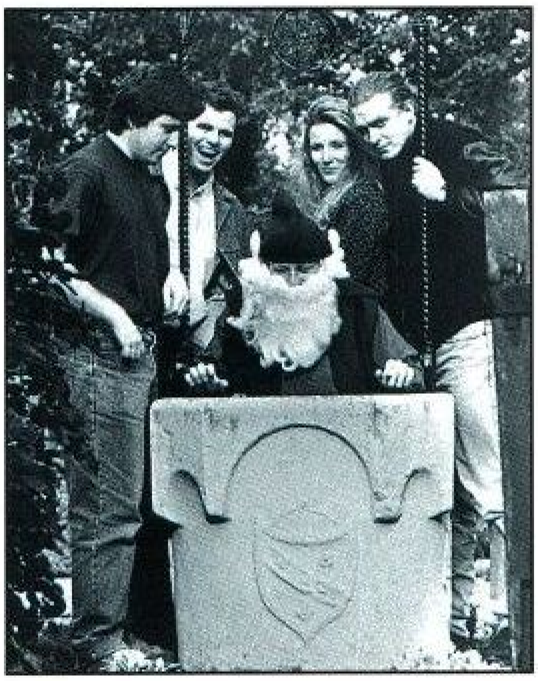
A PRINTER FOR CHRISTMAS

Room for one more largish goodie on your Christmas list? At just £279 + VAT, Citizen reckons you can't buy better for your computer boffins than the 124D 24-pin high quality dot matrix printer.

Positioned by Citizen as the lowest priced 24-pin on the market today, the 124D offers fast printing speeds of 120 CPS in draft mode, easy compatibility and simple to use operations.

With a unique full two year warranty on all parts and labour, the 124D looks pretty much of a bargain for education, home and small business users wishing to upgrade to 24-pin printing.





QUITE CONTRARY

How does your garden grow? Keep your eyes peeled for the next gem to come from the Electronic Zoo stable and you'll find out. Magic Garden is designed for all those who like gardening without the dirt.

So who's going to do it for you? Grobble the Gnome, of course. Using your skill and initiative, you must set your garden growing, keeping a close guard on your seeds, vegetables, greenhouse and pond. Slowly but surely, your careful efforts will be rewarded as your garden begins to blossom.

However, to liven things up a bit, there are other gnomes out there who want to destroy your efforts, as well as other spooky goings on. After all, it is a magic garden.

Magic Garden should be in the shops pretty soon and looks all set to be a real eye-opener. Look out for it!

STAR PERFORMANCE

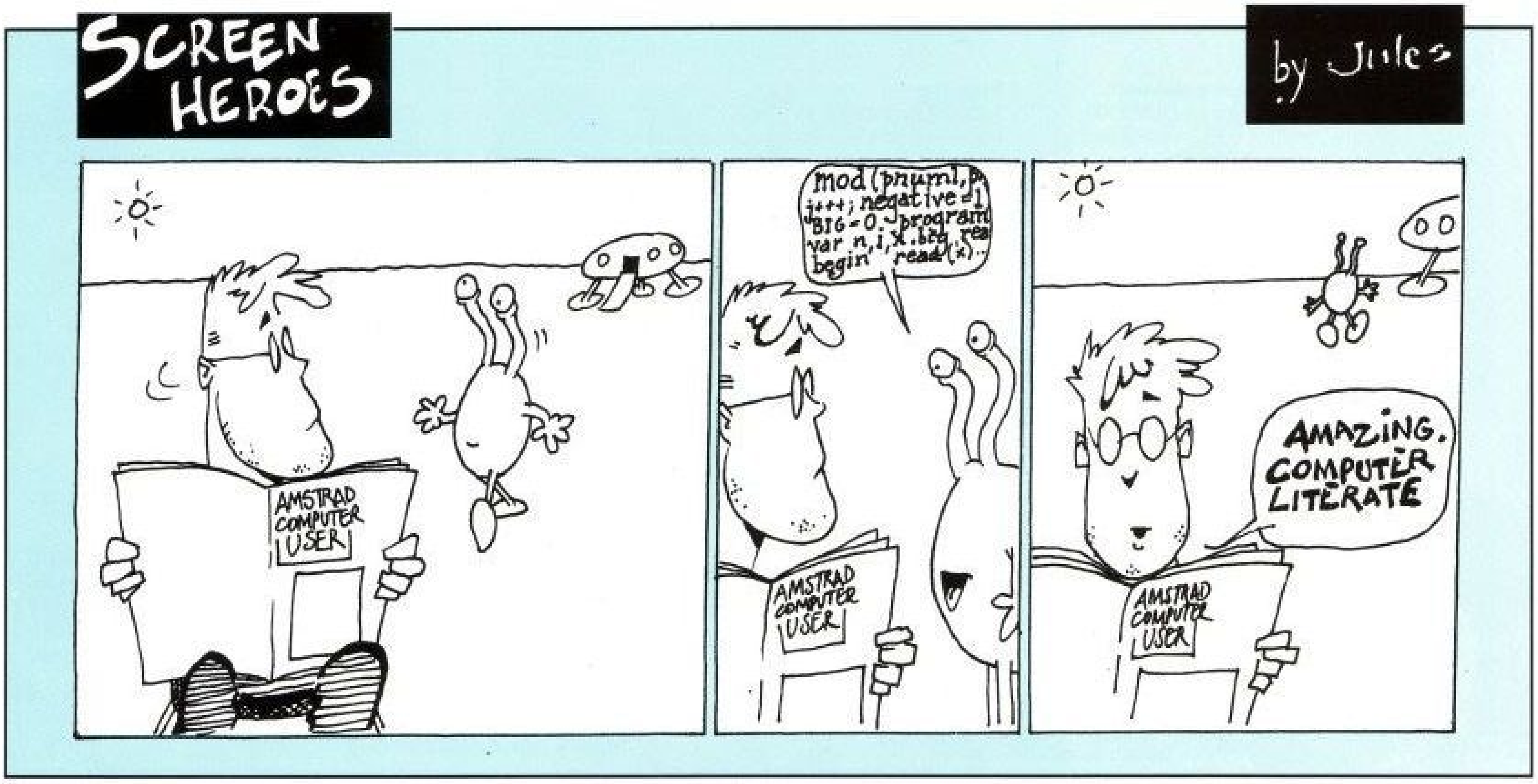
Electronic Arts has just announced a brand new range of cut price titles consisting solely of existing sell-out full price titles.

Star Performers features two classics for us CPC freaks to start with; Skate or Die and Chuck Yeager's Advanced Flight Trainer and, at just £6.99 for the disk and £2.99 for the cassette, these little beauties should sell kike the proverbial hot cakes.

Don't forget, that's just for starters, so keep a look out for new releases on the Star Performance label very soon, though with Electronic Arts' latest announcement to cut out support for the CPC, who knows how many of these goodies we'll actually get to see?

GOOD SUBSCRIPTIONS

Congratulations to the following winners in our MSM September subscription renewal draw:
J.D. Abercrombie from Surrey wins £150
J. Vallance from Glasgow wins £50.
G.F. Sainsbury from Essex wins £50.
When subscribers renew, their name will automatically be entered into our monthly renewal draw. Remember, you can renew at any time just by calling us on 091 510 2290. Good luck!



THE ROMANTIC ROBOT SOLUTION!



LIFE WITHOUT DIRECTION

REBEL WITHOUT A CAUSE



A CPC without a MULTIFACE TWO? What a glorious waste of time.

If you *use* a **CPC** *without* a **Multiface**, you're wasting time.

Loading programs always **from** the **start** instead of **continuing from** where you stopped **last time**, not being able to make **crucial back-ups** *whenever you need to*, not having a chance to **customize programs** or just *poke infinite lives - what a waste!*

MULTIFACE is to CPC what *wheels* are to *cars* - the **ESSENTIAL ADD-ON**!

Its *MAGIC button* lets you **FREEZE** a program **ANY time** - just have a break and continue later, or *SAVE, switch off*, and *reload to continue* later. Saving is FULLY **automatic**, all is *menu-driven with on-screen instructions, error reports* - **SO EASY!** You can also *study/modify programs* with the built-in **MULTI-TOOLKIT** - invaluable!

If you wish to make your computing *easy, fast, safe* and a *joy* - **get a MULTIFACE!**

CHRISTMAS WITHOUT PRESENTS



A CPC WITHOUT A MULTIFACE



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The puzzle's over! MULTIFACE - the CPC's missing link!

Also available: Please send a SAE for details

INSIDER - By residing OUTSIDE CPC - in a MULTIFACE - it can look INSIDE and disassemble ANY running program

RODOS - A ROM that changes CPC into a professional system

Hurry to get BIG DISCOUNTS

I order **MULTIFACE 2** for **CPC 464/6128** ☐ ~~£47.95~~ **£37.95** or for **CPC+** ☐ ~~£49.95~~ **£44.95**

RODOS ☐ ~~£29.95~~ **£19.95** **RODOS XTRA** ☐ ~~£9.95~~ **£6.95** **INSIDER** ☐ ~~£14.95~~ **£9.95**

PLUS P&P per EACH item: UK **£1**, Europe **£2**, Overseas **£3**.

I enclose a **cheque/PO/cash** for £............. or debit my **Access/Visa** No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Card Exp...............

Name/address..

The above reduced prices apply strictly only to MAIL ORDERS received by 15.1.1991.

ROMANTIC ROBOT UK LTD 54 Deanscroft Ave, London NW9 8EN ☎ 24 hrs **081-200 8870**

PRODUCE PICTURES LIKE THESE IN "MINUTES" USING A DMP2000/2160/3000/3160 PRINTER AND THE

DART SCANNER

A remarkable new image scanning system which enables you to recreate & store pictures, documents, drawings, photographs etc.



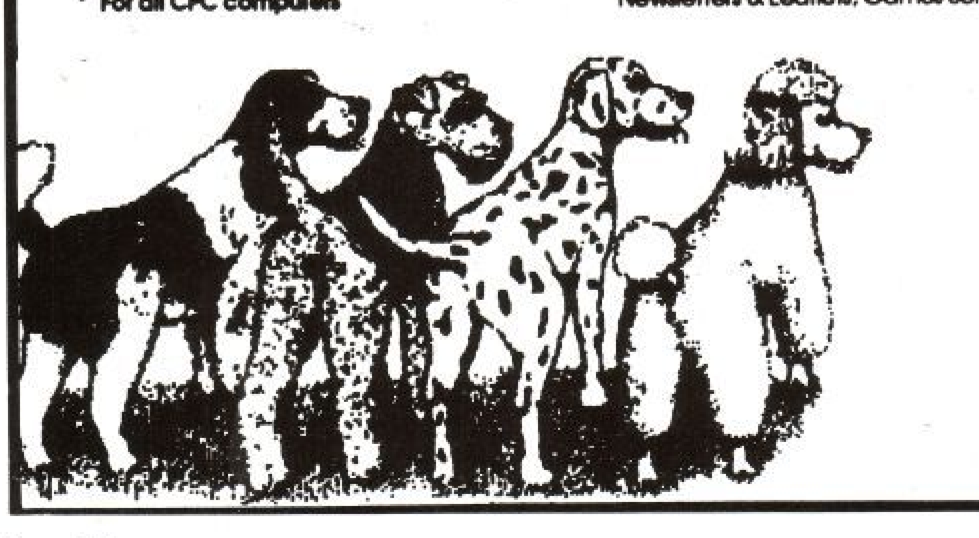
- **No camera or video source needed**
  Simply feed your original into DMP2000/2160/3000/3160 printer (does not affect normal printing operations).
- **Compatible with AMX Pagemaker**
  and any light pen or mouse which works with standard screen format
- **For all CPC computers**

Features:
Scan - Magnification x1, x2, x3, x6
Print - Full Size/Half Size, Load & Save to Tape or Disc, Area Copy, Scrolling Window, Zoom Edit, Box/Blank, Clear Area, Add Text, Flip Screen, On screen Menu.

Applications:
Advertising/Artwork, Letterheads/Logo's, Newsletters & Leaflets, Games Screens.

Package Comprises:
Scanner head, Interface, Software on Cassette or Disc

R.R.P. £79.95
Including VAT and P&P



DART Electronics

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School Road
LOWESTOFT
Suffolk NR33 9NA

Telephone: (0502) 513707

Trade & Export enquiries also welcome

ZIGGY'S MAILBOX

Going-Up

I own an Amstrad CPC 6128. Could you please tell me if it is possible to increase the memory from 128K to 512K? Also, would it be able to use PC software if the memory is increased?

These questions have been driving me around the bend for some time. Thanks a lot.

M. Witzke, Hilton, South Australia.

Ziggy: Yes indeedie! Using some very nifty new RAM packs from Fritz Obermeier Computing, you can get up to 512K of memory on your CPC. However, you may have to fork out around £150 to get one. On the PC-CPC front, try having a look at Siren Software's PC Trans, which is easy to use and allows you to transfer data between a PC and CPC or vice versa.

For more info, try ringing Fritz Obermeier on 01049-5732-3246. Alternatively, you should get the lowdown on the packs very soon in these pages. Siren Software can be reached on 061 228 1831.

For Sale

Would anybody like to buy an Amstrad CPC 6128 with six hundred pounds worth of software for about £500? I personally think it's a good deal, so why not phone and make me an offer on Huntingdon 0480 454265.

The reason that I'm advertising here is because you don't have an ad column like some other mags. How about adding one to this brilliant mag?

Oh and by the way, we're selling two of these packages but that doesn't mean they'll be around for long.

David Jaggard, 43 London Road, Godmanchester, Huntingdon, Cambs.

Ziggy: Any takers? The ACU team has been considering an ads column for some time now, so if you have any offers, or want anything in particular, write in and we'll see about getting one set up.

Fantasy Time

First of all, I have a favour to ask you. I am attempting to set up a fanzine dedicated to new writers of science fiction/fantasy. It will be set up along the lines of a writers' workshop. Each issue will contain, depending on the length, one or two short stories or a novella. The following issue will then contain letters of praise and constructive criticism on those stories as well as new ones. There is more, but this is the basic premise. The favour is this: that you print this letter and my address in full so that people interested can write to me (enclosing an SAE) for an information pack.

You may be asking what this has to do with ACU. Well, it's simple. The whole thing will be put together using Pyraword and Stop press on a 6128. Neat tie-in, eh? If you could do this, I would be eternally grateful.

Secondly, as I say above, I am using Pyraword to do most of the donkey-work. I really need to upgrade to something a little beefier. I have seen the advert in ACU for Brunword 6128, specifically the package "9 pin Elite". The list of comparative timings is very impressive, especially when I have heard such good things about Protext. What do you think? Given the choice, which would you choose?

I hope you can help me out on both of these matters.

Simon Warford, 134 Draper House, Hampton Street, London SE1 6SY

Ziggy: There's the address for all you budding Sci-Fi writers. I may even send one of my little offerings down. As for the word processors Simon, both Protext and Brunword have their advantages and you really need to go into your local shop, compare what each package contains for the amount of money you can spare and then work out exactly which of those packages most suits your specific requirements. Good luck with the Fanzine.



COMPETITION



We've had some pretty incredible prizes in the pages of ACU in the past, but this one, courtesy of the marvellously benevolent people at Mirrorsoft, really must take the honours for the Festive Season.

Just answer the three simple questions below and the first correct entry pulled out of the mailbag will win the amazing Turtles movie on video AND an unbelievable video recorder to play it on! For the 10 lucky runners up, there are also 10 groovy Turtles goody bags to be won, jam-packed with reptilian wares. Right, get thinking and start winning.

1. Which country do Pizzas originate from?
2. What is the name of the Turtles' rodent-like master?
3. What colour is Donatello's bandana?

The editor's decision is final.
Send your entries to:

Turtle Mania
ACU,
MSM Ltd.,
116-120 Goswell Road,
London EC1V 7QD.

CALLCOST



BY S. C. LEAK

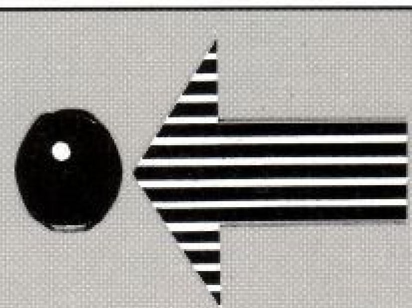
Ever wondered just how much you were squandering on those long phone calls to the States? Here's the thing for you, then. Just input the duration of the call, charge band and rate and the units used and cost will leap up before your eyes. Before and after VAT of course.

```
10 MODE 1:up=4.4:vr=15:DIM t(20,3):FOR b [CF]
=1 TO 20:FOR r=1 TO 3:READ t(b,r):NEXT:N [CF]
EXT [CF]
20 WHILE 1:INPUT "Minutes";m:INPUT "Seco [B5]
nds";s:INPUT "Charge Band? (L/A/B1/B/M/P [B5]
1/IR/1-13) ",b$:INPUT "Charge Rate? (C/S [B5]
/P) ",r$ [B5]
30 IF b$="l" THEN b=1 ELSE IF b$="a" THE [D3]
N b=2 ELSE IF b$="b1" THEN b=3 ELSE IF b [D3]
$="b" THEN b=4 ELSE IF b$="m" THEN b=5 E [D3]
LSE IF b$="p1" THEN b=6 [D3]
40 IF b$="ir" THEN b=7 ELSE IF b$="1" TH [BC]
EN b=8 ELSE IF b$="2" THEN b=9 ELSE IF b [BC]
$="3" THEN b=10 ELSE IF b$="4" THEN b=11 [BC]
 ELSE IF b$="5" THEN b=12 ELSE IF b$="6" [BC]
 THEN b=13 [BC]
50 IF b$="7" THEN b=14 ELSE IF b$="8" TH [F7]
EN b=15 ELSE IF b$="9" THEN b=16 ELSE IF [F7]
 b$="10" THEN b=17 ELSE IF b$="11" THEN  [F7]
b=18 ELSE IF b$="12" THEN b=19 ELSE IF b [F7]
$="13" THEN b=20 [F7]
60 IF r$="c" THEN r=1 ELSE IF r$="s" THE [31]
N r=2 ELSE IF r$="p" THEN r=3 [31]
70 ms=m*60:d=ms+s:u=INT(d/t(b,r))+1:c1=u [F7]
*up:v=c1*vr/100:c2=c1+v [F7]
80 PRINT CHR$(7):PRINT "Units =";u:PRINT [1B]
 "Cost (exclusive of VAT) =";c1;"p":PRIN [1B]
T "Value Added Tax @";vr;"%  =";v;"p":PR [1B]
INT "Cost (inclusive of VAT) =";c2;"p":P [1B]
RINT:WEND [1B]
90 DATA 240,85,60,81.8,35.1,26.25,51.5,3 [9A]
1,23.25,38.8,24.8,18.6,12,8,8,9.2,6.9,6. [9A]
9 [9A]
100 DATA 10.8,8,8,9,7.2,0,6.65,5.45,0,5. [46]
15,4.35,0,5.15,4.35,3.95,4.68,3.95,3.59, [46]
3.8,3.05,0,3.8,3.05,0,3.55,2.9,0,2.68,2. [46]
3,0,2.65,2.25,0,2.26,2.15,0,2.22,2.15,0, [46]
2.19,2.15,0 [46]
```

PINBALL

BY L. RAPACCIOLI

Get tilting with this nifty pinball simulator. The red bonus bumpers will appear at random, so press ENTER to set the ball rolling and use the SPACE bar to control the flippers. It's tricky to get used ot it, but it's well worth having a go.

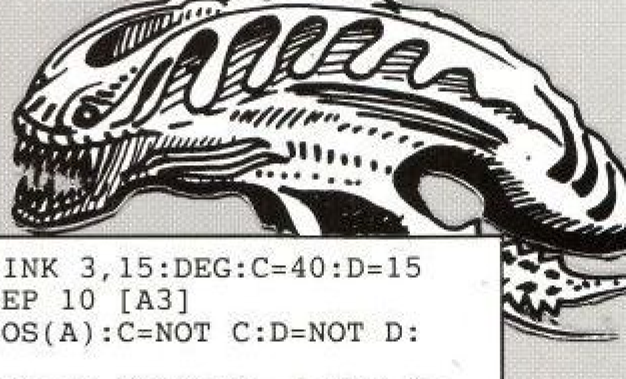


```
10 MODE 0:BORDER 0:SYMBOL 240,93,189,93,189,93,189,93,189:SYMBOL 241,186,189,186
,189,186,189,186,189:SYMBOL 242,224,16,232,244,250,189,93,189:SYMBOL 243,7,8,23,
47,95,189,186,189:SYMBOL 244,255,0,255,255,255,170,85,170:SYMBOL 249,0,1,62,193,
193,62,1,0 [04]
20 SYMBOL 245,170,85,170,255,255,255,0,255:SYMBOL 246,189,186,189,95,47,23,8,7:S
YMBOL 247,189,93,189,250,244,232,16,224:SYMBOL 250,60,66,90,189,189,90,66,60:SYM
BOL 251,0,128,124,131,131,124,128,0:SYMBOL 248,90,36,36,36,36,24,24:PEN 1:INK 0,
2:INK 1,18:TE=0 [57]
30 DEF FNA=INT(RND*F)+G:F=5:G=10:A=FNA:A$=STRING$(A,CHR$(244)):LOCATE 2,4:PRINT
CHR$(243);A$;CHR$(242):A$=STRING$(A,245):G=13:B=FNA+5:LOCATE 2,B:PRINT CHR$(246)
;A$;CHR$(247):FOR N=5 TO B-1:LOCATE 2,N:PRINT CHR$(241):LOCATE A+3,N:PRINT CHR$(
240):NEXT [DF]
40 INK 13,7:INK 14,2:INK 15,7:INK 2,0:LOCATE A+1,B-1:PRINT CHR$(241):PEN 13:LOCA
TE (A/2)+1,B:PRINT CHR$(250);"   ";CHR$(250):PEN 14:LOCATE (A/2)+2,B:PRINT CHR$(
251);CHR$(128);CHR$(249):PEN 15:LOCATE (A/2)+1,B+1:PRINT CHR$(248);"   ";CHR$(24
8) [DD]
50 LOCATE 1,1:PRINT"P I N B A L L":XX=-1:YY=-1:X=A+2:Y=B-1:PEN 2:LOCATE X,Y:PRIN
T CHR$(202):WHILE INKEY(18)<>0:WEND:SPEED KEY 20,50:FOR N=1 TO 13:LOCATE 2+INT(R
ND*(A-2))+1,6+INT(RND*(B-12)):PEN 3:PRINT CHR$(252+INT(RND*3)+1):NEXT N:PEN 2 [7
5]
60 PEN 2:LOCATE X,Y:PRINT " ":X=X+XX:Y=Y+YY:L=Y+YY:LOCATE X,Y:PRINT CHR$(202):LO
CATE X,L:C=ASC(COPYCHR$(#0)):IF X<4 OR X>A+1 THEN XX=-XX:SOUND 1,100,5,15 [B4]
70 IF C=249 AND TE=0 OR C=251 AND TE=0 OR Y>B THEN GOTO 100 ELSE IF C>239 AND C<
252 THEN YY=-YY:SOUND 2,150,5,15 ELSE IF C>251 THEN YY=-YY:SOUND 3,300,15,15:SC=
SC+INT(RND*1000)+1:LOCATE 1,3:PRINT"SCORE ";SC:IF RND*3<0.6 THEN LOCATE X,L:PRIN
T" " [66]
80 IF RND*3<0.2 THEN PEN 3:LOCATE 2+INT(RND*(A-2))+1,6+INT(RND*(B-12)):PRINT CHR
$(253) ELSE IF INKEY$=" " THEN INK 14,7:INK 15,2:FOR N=1 TO 20:NEXT N:TE=5 ELSE
INK 14,2:INK 15,7:TE=0 [98]
90 IF MISS=5 THEN FOR N=1 TO 2000 STEP 25:SOUND 3,N,2,15:NEXT N:CLS:MODE 1:PEN 1
:PRINT"Your Score is ";SC;".Press S to play again or Q to quit":WHILE I$<>"S" AN
D I$<>"Q":I$=INKEY$:WEND:IF I$="S" THEN RUN ELSE END ELSE GOTO 60 [FD]
100 LOCATE X,Y:PRINT" ":SOUND 1,500,20,15:LOCATE 1,2:MISS=MISS+1:PRINT"MISSES ";
MISS:PEN 1:IF MISS=5 THEN 90 ELSE 40 [AA]
1000 PRINT RND*3 [79]
1010 GOTO 1000 [09]
```

ALIEN

BY L. RAPACCIOLI

A marvellous graphics demo here, which will design an alien landscape as seen through the porthole of your spaceship. Watch as the weird and wonderful shapes develop and then press SPACE for the final touch.



```
10 MODE 1:PEN 1:PAPER 0:BORDER 0:INK 0,0:INK 1,5:INK 2,22:INK 3,15:DEG:C=40:D=15
:B=300:FOR N=1 TO 7:PLOT 320+B+100,200,1:FOR A=0 TO 360 STEP 10 [A3]
20 DRAW 320+(B+100)*COS(A),200+B*SIN(A):DRAWR C*SIN(A),D*COS(A):C=NOT C:D=NOT D:
NEXT A:B=B-20:NEXT N [50]
30 PLOT 40,202,1:DRAW 600,202:MOVE 42,200,1:FILL 3:FOR N=200 TO 20 STEP -5:FOR M
=40 TO 600 STEP RND*7+7:IF TEST(M,N)=3 THEN DRAW M+RND*6,N+RND*12:DRAW M+5,N [AD
]
40 NEXT M,N:F=1:G=385:H=226:I=25:GOSUB 70:F=2:G=350:H=252:I=50:GOSUB 70:G=300:H=
222:I=20:GOSUB 70:F=1:G=200:H=242:I=40:RAD:GOSUB 70:F=2:G=130:H=226:I=25:GOSUB 7
0 [D5]
50 DEG:FOR A=90 TO 450 STEP 3:PLOT 505,300,1:DRAW 505+10*COS(A),300+10*SIN(A):PL
OT 485,300,3:DRAW 485+20*COS(A),300+20*SIN(A):NEXT A:DEG [56]
60 IF INKEY$=" " THEN GOSUB 80:GOTO 60 ELSE GOTO 60 [D8]
70 FOR N=1 TO 360 STEP 7:MOVE G+I*SIN(340),H+I*COS(N),F:DRAW G+I*SIN(N),H+I*COS(
200):NEXT N:RETURN [AE]
80 FOR N=0 TO 198 STEP 4:IF N>168 THEN GOTO 90 ELSE PLOT 300+220*COS(N),200+120*
SIN(N),2:DRAW 300+220*COS(N+3),200+120*SIN(N+3):DRAW 300+220*COS(N+3),200+120*SI
N(N):DRAW 300+220*COS(N),200+120*SIN(N+3):IF N<20 THEN GOTO 100 [C9]
90 PLOT 300+220*COS(N-20),200+120*SIN(N-20),0:DRAW 300+220*COS(N-17),200+120*SIN
(N-17):DRAW 300+220*COS(N-17),200+120*SIN(N-20):DRAW 300+220*COS(N-20),200+120*S
IN(N-17) [26]
100 SOUND 3,N/25,30,3,,,N/15:NEXT N:RETURN [C1]
```

ERNIE & BERT

BY N. HUTTON

You know those two lovable characters from Sesame Street? Well, here they are, lovingly reproduced for your pleasure. Type them in, run them and there you are, face to face with some real grouchos.

```
10 REM          BERT

20 REM    BY  NICK HUTTON

30 MODE 1:INK 0,26:INK 1,0:INK 2,6:INK 3,24:BORDER 15:PAPER 2:PEN 3
  :FOR a=1 TO 25:PRINT STRING$(40,207);:NEXT

40 FOR z=0 TO 1:p=2:x=244+z*152:y=220:rx=30:ry=35:GOSUB 90:NEXT
  :y=200:x=320:rx=70:ry=130:GOSUB 90:FOR z=0 TO 1:FOR w=0 TO 1:p=-1+w
  :rx=24-w*12:ry=rx:x=290+z*60:y=220-w*10:GOSUB 90:NEXT w,z:p=1:x=320
  :y=174:rx=28:ry=40:GOSUB 90

50 FOR a=264 TO 376 STEP 2:PLOT a,233+RND*4,1:NEXT

60 FOR a=-30 TO 30 STEP 3:PLOT 320+a,372-RND*5:DRAW 320+a*0.8,320:NEXT

70 PLOT 320,120:DRAWR 12,4:DRAWR 16,0:DRAWR 12,-4

80 GOTO 80

90 FOR c=0 TO 1:ry=ry-c*2:rx=rx-c*2:f=ry/rx:r2=rx*rx
  :FOR a=0 TO rx STEP 2:b=f*SQR(r2-a*a):FOR d=-1 TO 1 STEP 2
  :PLOT x+d*a,y+b,1+c*p:DRAWR 0,-2*b:NEXT d,a,c:RETURN
```

```
10 REM            ERNIE

20 REM        BY NICK HUTTON

30 MODE 1:INK 0,26:INK 1,0:INK 2,6:INK 3,15:BORDER 6:PAPER 2:PEN 3
  :FOR a=1 TO 25:PRINT STRING$(40,207);:NEXT

40 FOR z=0 TO 1:p=2:x=200+z*240:y=220:rx=30:ry=30:GOSUB 90:NEXT
  :y=200:x=320:rx=130:ry=90:GOSUB 90:y=180:rx=100:ry=50:p=1:GOSUB 90
  :rx=110:ry=40:y=200:p=2:GOSUB 90:FOR a=190 TO 240 STEP 2:PLOT 200,a
  :DRAWR 240,0,3:NEXT

50 FOR z=0 TO 1:FOR w=0 TO 1:p=-1+w:rx=24-w*12:ry=rx:x=270+z*100:y=210
  :GOSUB 90:NEXT w,z:p=1:x=320:y=174:rx=30:ry=34:GOSUB 90

60 FOR a=0 TO 60 STEP 2:FOR z=0 TO 1:PLOT 240+z*100+a,243+RND*4
  :DRAWR 0,8+RND*4,1:NEXT z,a

70 FOR a=-100 TO 100 STEP 3:h=SQR(10200-a*a)/5:PLOT 320+a,302+h-RND*5,1
  :DRAW 320+a*0.8,260+h:NEXT

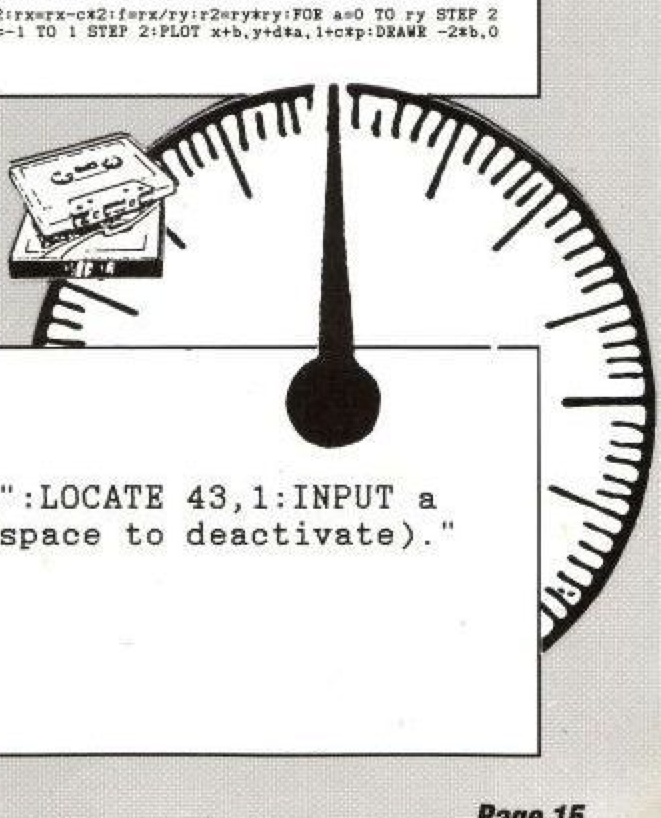
80 GOTO 80

90 FOR c=0 TO 1:ry=ry-c*2:rx=rx-c*2:f=rx/ry:r2=ry*ry:FOR a=0 TO ry STEP 2
  :b=f*SQR(r2-a*a):FOR d=-1 TO 1 STEP 2:PLOT x+b,y+d*a,1+c*p:DRAWR -2*b,0
  :NEXT d,a,c:RETURN
```

TIMER

BY PAUL FERGUSON

Something for 6128 owners with tape decks here. Run it and use it to set your recorder to tape all your favourite radio progammes while you go off and eat your tea!



```
10 'timer by: Paul Ferguson
20 CALL &BC71
30 MODE 2:INK 0,0:INK 1,26:BORDER 0:PAPER 0:PEN 1
40 PRINT"What is the delay time required in seconds":LOCATE 43,1:INPUT a
50 a=a*50:PRINT:PRINT:PRINT"Delay activated (press space to deactivate)."
60 AFTER a GOSUB 100
70 b$=INKEY$
80 IF b$="" THEN GOTO 70 ELSE 90
90 IF b$=" " THEN GOTO 30 ELSE 70
100 CALL &BC6E
```



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Costing For Profit

Essential utilities for the small businessman from ABC Software: John Taylor investigates.

Small Business Accounts is for use with the Amstrad CPC 6128. It is intended to be used by small firms and the self-employed, who may have no need of larger programs or may not be able to afford them. Small Business Acounts is a password-protected, menu-driven program. It works by allowing the user to compile files, one month to each file (although one month can be divided into two files if the user wishes). Files are split into entries. There can be 300 of these entries and every one is further split into thirteen columns. The columns represent an income and expenditure book, to make life easier for those transferring their accounts from paper. Calculations are done automatically; another big time-saver.

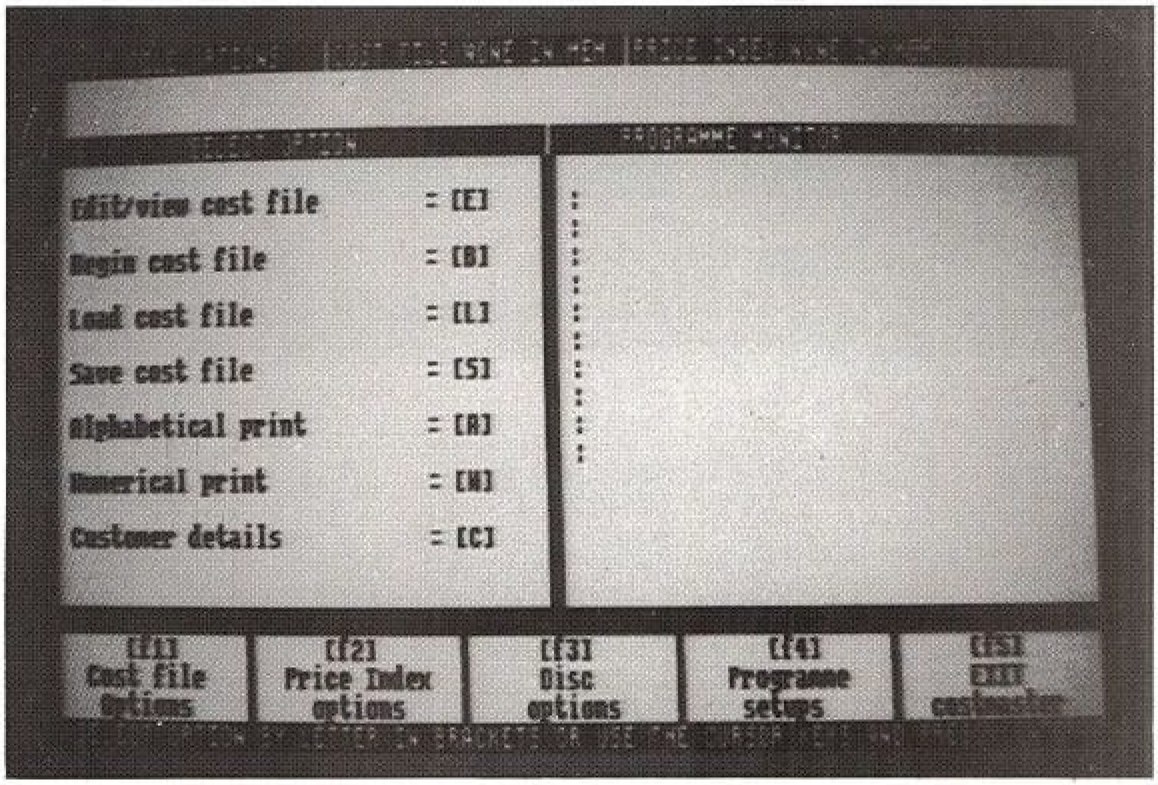
Before entering data, the user must name his file and then the program will add the file type definition automatically. There are two file types; one to denote those containing accounts information, the other to show files containing standing order information, the other to show files containing standing order information. These can be merged into data files via a menu. When entering data into files, the user will receive no on-screen help but there is help readily available throughout the rest of the program. When displaying a file entries can be sorted into date or payment order, moved through by cursor or searched for a given phrase. Other functions are available whether the user is only viewing or actively entering data. Some options, however, are only available during the data entering function. These include the copying of data, auto sequential numbering of entries and VAT calculations.

The Print option allows the user to print out such things as VAT totals and selected items of his choice. There is also a menu option left free for the user to write a routine to suit his custom printing needs. When printing, users must remember that only data stored on disk can be printed, so the file just worked on must be saved first. The disk contains examples for users to work through and there are more examples in the manual. This

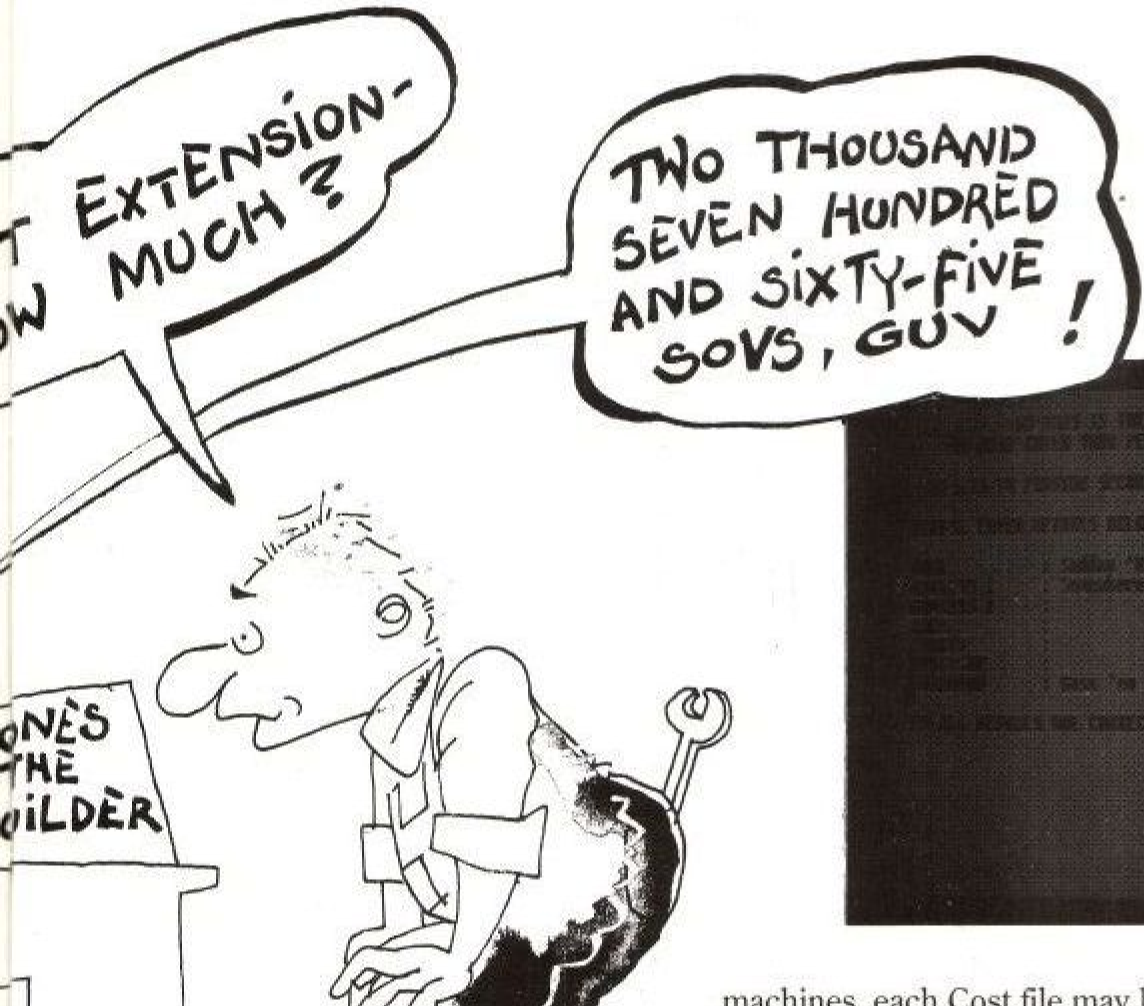


is a well-written booklet. It deals with topics in the order users are expected to need them and all explanations are in plain English.

Small Business Accounts
A.B.C. Software
Price: £27.60 incl. VAT
Tel: 0934 516714



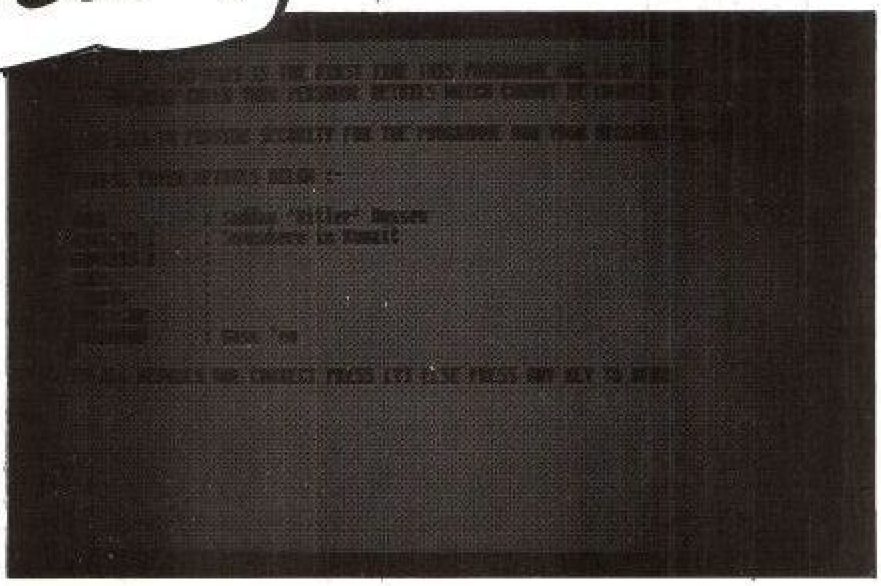
Costmaster is a program that helps to estimate and cost jobs. It is for use with the Amstrad CPC 6128. The user inputs his data into Cost files. These are made up of three parts; the main Cost file entry, the Alphanumeric definitions and the customer details. There are 26 Alphabetical (up to 35 characters) and 10 Numerical definitions (up to 18 characters) that can be defined in the Alphanumeric file. The programme already contains a predefined set, so users can save these and load them automatically. Customer details can either be entered through their own option or through the option for beginning a new file. This file can be accessed separately from the overall Cost file, which means that users have a built in customer file that can be used to load details into any file. For unexpanded 6128 machines, each Cost file may have up to 200 entries. Files may have any name legal under AMSDOS but the extensions .IDX and .DEF are already taken up elsewhere in the program. The manual gives a list of all other extensions that should not be used.





Apart from the obviously needed functions, users also can edit alphanumeric definitions, and manipulate a Price Index if there is one in use. Printing can be either alphabetical or numerical. Each printout will show customer details, individual totals and the overal total.

Once manipulated to the user's satisfaction, the Price Index can be printed out too. All files can be catalogued so the user can see how much space they take on disk. The Supercat option allows the user to quickly check a file, perhaps a customer file for extra detail. It screens the catalogue for all files that could be costing files and only gives those choices. That is why it is so important to use the right extension for filenames. For those who need it, the program also supports the Amstrad KEY command. Temporary keys can be defined or keys can be altered permanently.



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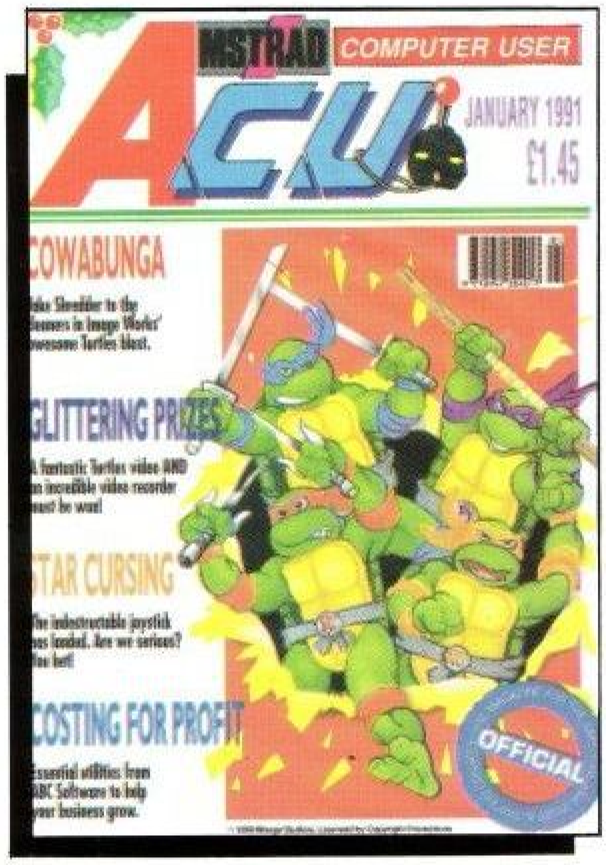
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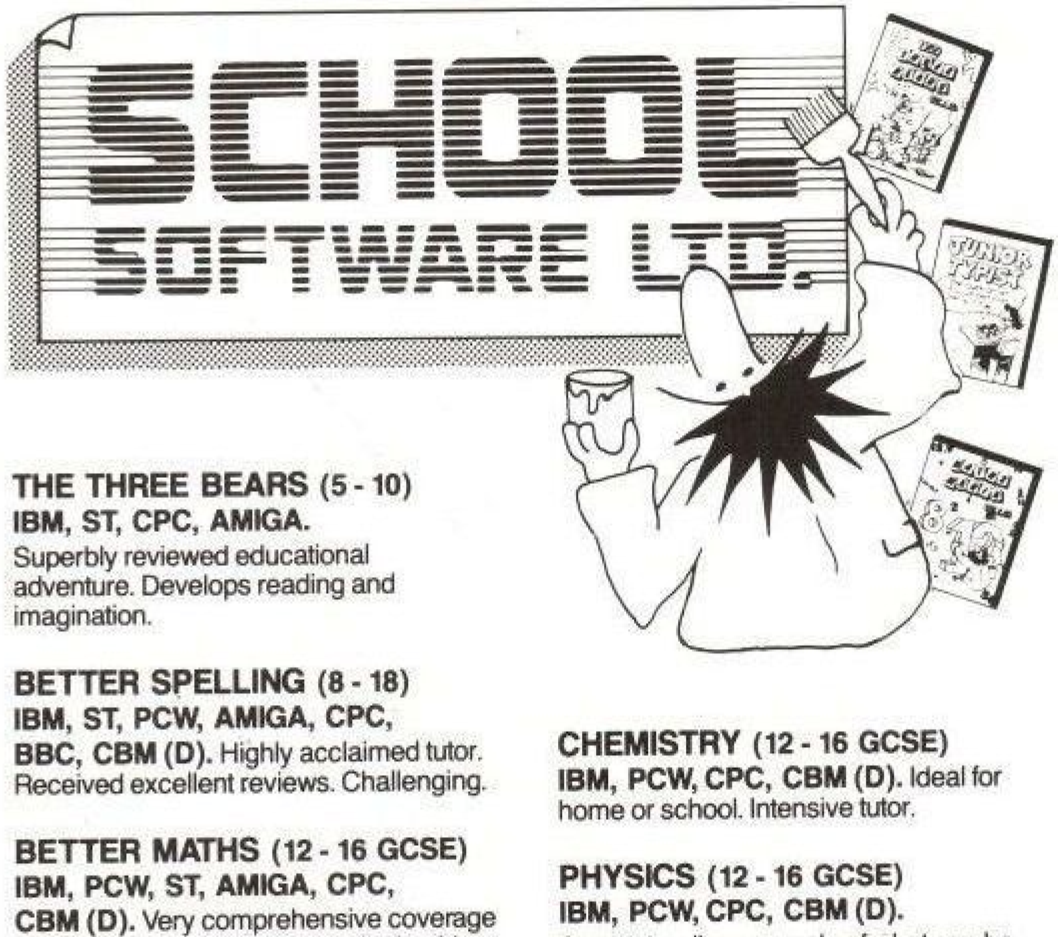
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COMBAT ZONE

Bashing, blasting and zooming – John Cook shows you the best way to keep the cold weather at bay.

I don't know if you've ever been to a seaside resort like, say, Blackpool this time of year, but it's rather like walking into one of those Charlton Heston disaster movies, where everyone else in the world has been taken out by some deadly nerve gas, and you're left walking around the deserted cityscape. You know the scene, hotwiring abandoned cars, taking tins of spam from empty supermarkets. At least that's what I told the police.

In fact, in the Winter, the population of these places simply migrates from one exhibition or show to another, judging from the turnout at the recent Associated Leisure Preview, held in London. This is the first show of the season, and as such, usually has a few surprises in store. Not so this season.

Star of the show was the long awaited Race Drivin' from Atari Games, the follow up to, of course, Hard Drivin'. Much harder in difficulty, with two new courses included and a pseudo two player option, the 3-D performance still significantly lags behind that displayed in Namco's Winning Run – now available with another (again much harder) circuit.

OK, so Race Drivin' is far from being a pile of doggie doos, but I guess we'd all hoped that over a year of development would bring something better than this. Still, it's bound to be in every arcade in the country by next Easter, so we'll be doing an in-depth look at the game next issue.



My own favourite of the Show was a completely excellent driving game from Jaleco called Cisco Heat. Now, you'll recall that Jaleco this time last year, brought out a driving game called Big Run, set fairly firmly in the Outrun mould, although it did have the advantage of being able to link together a number for units for multi-player action.

Not astonishing, but not crap – Big Run was definetly a departure for Jaleco, until that time, mainly a developer of average PCB games. Now, with the release of the splendid Cisco Heat, the gauntlet has been very firmly thrown down to the big boys of the video game business. These guys can cut it in a big way!

The scenario for the thing is quite straightforward - you are driving a police car in the annual police car race across San Francisco. Starting on the Golden Gate Bridge, you progress across town (the first Stage being to Fisherman's Wharf) – and if you make it in time, from there onwards, Downtown. And boy, is it exciting stuff.

San Francisco has a number of interesting elements in its geography that



make driving around it something of a challenge. Firstly, it's very hilly. I mean exceptionally hilly. Driving around some of the downtown area, it seems like first the sky then the road fill the whole of your windscreen, like taking a ride on an urban roller coaster, only interrupted by brief flat areas at intersections, where another road crosses yours at right angles.

The grid-like road layout makes another interesting feature - if you need to turn a corner, then it's gonna be a 90 degree job!

Cisco Heat is faithful to both these characteristics. The up/down geography is faithfully reproduced (with bottom brusing violence in the sit-down version) and the enforced 90 degree turns are licenced to thrill.

Controls are simple and very accessible – steering wheel, accellerator and brake, with high/low gear stick. And the learning curve is reasonably short. Drive flat out, avoiding the rest of the traffic (usually going in the same direction as you, apart from the Cable-Cars), until you get to one of those sharp turns. Just before you hit the bend, change down and throw the wheel in the required direction, charg-



ing back up half way through the corner. Vroommmmm!!!!! More fun than opposite locking on a slip road entering the M4 – I came tell you.

Cisco Heat is not a simulator (unlike Race Drivin'). There are even times when the sprite technology breaks down, due to the amount of information being thrown on screen at one time. But the overall speed of the graphics and the impact of the sonics – plus the realistic movements of sit-down version – makes it the most enjoyable and exciting driving game in recent gaming history. This one, you have to have a go on. Coming to an arcade near you, sometime in '91.

Other new stuff – Pit Fighter from Atari Games was well hyped in the run up to the show, as a combat game featuring digitised graphics, rather than the more usual hand drawn sprites. The action also moves in/out of the screen a little, into the background then out again into the foreground, depending on the movments of your fighter. Distinctive looking, yes. However, the overall feeling was that it lacked the playability of, say, Capcom's Final Fight, based on more convertional display techniques.

Up to three players can play at one time – each choosing a character which has a different sort of specal attack, and is slightly better at some things than others. The overall theme of the game is definately a bit LA designer punk, with spiky hair and suspender belts being very much in evidence (no sexism here chief – other than all the characters you can choose are male, but you do get to beat up on both sexes).

The control system will take a bit of practice to get the most out of it, with a joystick and three fire button.

It's a nice try to do something different, but memory limitations mean that the number of frames stored per character are still too few to present convincing animation to the player. Perhaps it's no worse than the average





Beat-em-up, but if that is the case, then the fact that the sprites look more 'realistic' mean that the player's suspension of belief is lowered, and you notice glitches that pass you by on a more conventional looking game.

The best Sega could offer, to my mind, was a new two player motorcycle racing game, GP Racer. Nother wildly new in technology, other than some neat landscape effects, introducing hills into the track, but it plays well and is a fine two player bash, well up to Sega's exemplary standards. Use the manual gear option if you want to really get around in a fast time.

Also on display from the Japanese giant was its second electronic shooting gallery game, the direct follow-up to Line of Fire, called Ghost Hunters. Plenty of Ghosties and Ghoulies to blow away, and none of them looking a bit like the ones in Ghostbusters, honest!

The added gimmick to this three player thrash, is that you look at the screen via a second glass sight, which superimposes red laser fire onto the screen. Golly.

Graphics are OK on this one, but it can't be said to trancend its genre.

Finally, just in case you thought that the Japs really do come from our galaxy, check out the latest novelty game to come from the other side of the world – Cosmic Gang from Namco. Weeblie Space Invaders come down the tracks to nab your crates of energy. You have to zap them with a ray gun.

Personally I prefered hitting moles over the head in Sweet Licks, but what the hell do I know. If Karaoke is your bag, try this. It causes less offence to innocent bystanders and is marginally more cathartic. See you down the Sushi Bar then – and next month with our in-depth Hard Drivin' feature.

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Allo, Allo! Listen very carefully, I shall say this only once. This is Andrew Banner, De Cable will cut the costs of disc storage.

Sizing it up


Result: De Cable 5.25 – scalpel Ø.

The Amstrad decision to adopt the non-standard 3 inch disc drive was one of it's worst ever. Although the drives are cheap, the cost of the discs is just ridiculous. The costs of 5.25 inch discs is now at an all time low with packs of 25 being readily available for less than the price of a CD.

So with the retail costs of 3 inch discs stabilised at about £20 for 10, it makes sense to use the much cheaper 5.25 floppies. It's easy to use these discs with your CPC too. Simply get a 5.25 inch disc and a 3 inch together and place the large floppy on a cutting board and then position the 3 inch over the top making sure it's perfectly central. Mark around the 3 inch floppy, take it away. Then, using a scalpel or sharp Stanley Knife and a steel rule, cut around the marks you made and volia! Cheaper discs!

Unfortunately, a few people have expressed the view that these new, home modified, discs are unreliable (in fact to the degree that they don't work at all) and have turned to the De Cable.

With a name like De Cable it sounds like a French product, but it's actually produced in Whitstable, Kent. It's a particularly messy product to look at but that doesn't matter much as all of the wiring is hidden inside the CPC. Fitting it is simple. Just open the case, remove the cable from the rear of the disc drive and attach the corresponding connector on the De Cable. Now plug the cable you've just removed into another part of the revolutionary De Cable and feed the circuit board through and plug it into the disc drive connector. Then struggle to fold the ribbon cabling about a bit and screw the casing back together again.

So, now you have a CPC with a strange circuit board poking from the back with two toggle switches. This board can now be directly connected to most standard 5.25 inch floppy disk drives and will now work perfectly with the CPC. However, you first of all need to find a supplier of such drives. Usually, obtaining an uncased drive is easy peasy, but this won't have a power supply. A cased unit will have this national grid adaptor but at considerable extra cost. Even so, I'm assured that you can buy such drives for about £70, so it's not too expensive.

The switches on De Cable offer two things. One allows you to select the external drive to function as unit A: without any software at all. The second switch flips between side one and two of the drive as it is not possible to have, even a double sided drive, read and write to both heads. However, the switch avoids having to flip the disk. The cable is also fully compatible with Multiface II.

Once you've got your CPC with additional 5.25 inch floppy, you can enjoy the advantages of amazingly cheap disk storage. It's easy to install, cheap to buy, easy to use and represents real value for money. The expensive part is buying the disc drive, but if you experience problems finding one, ABC Holdings can supply them. The package is rounded off with a lifetime guarantee.

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Mince Pies And Pokes...

Keep your keyboard warm over the festive season with a special Christmas Collection of Vax's pokettes.

Merry Pagan Festival, Hackfans! The silly season is upon us once more, with jingle bells, holly, ho ho ho's, snowmen, and red-nosed editors, I mean reindeer, and me in the traditional Xmas outfit. No sooner have I recovered from that lot and it's time for New Year, with Scotsmen in kilts, the old feller with a scythe and egg-timer, endless reviews of 1990, and one mother and father of a hangover on the 2nd of Jan.

Still, you've got the special festive pull-out-and-keep pokette pamphlet (as opposed to pull-out-and-chuck-away pokette pamphlet) to keep you busy over the hols, and the benefit of the amazing Graham Smith of Zummerzet to relieve the boredom of having to live on a diet of turkey, mince pies, brandy and rock-hard christmas cake. While you hammer out the first of Graham's pokeykins into your amster, I'll help meself to a mince pie and a wee glass of brandy.

```
1 ' Bigfoot -tape-
2 ' By Graham Smith
3 ' Infinite lives
4 '
10 MEMORY 14900
20 a=3082:LOAD"
30 FOR j=0 TO 32
40 READ a$
50 x=VAL("&"+a$)
60 POKE j+48640,x
70 y=y+x:NEXT j
80 IF y<>a GOTO 190
90 CALL 48640
100 DATA 2a,38,bd,22
110 DATA 21,be,21,37
120 DATA bd,36,c3,23
130 DATA 36,1b,23,36
140 DATA be,21,40,00
150 DATA e3,11,00,bb
160 DATA c3,4a,3a,3e
170 DATA b7,32,f5,0f
180 DATA cf
190 PRINT"DATA ERRIR
```

As you can see, it's a pokette for Bigfoot, a creature I sympathise with. Why ? Because I too am a hairy creature with big feet, but I can also do gymnastics: I can poke my big foot in my mouth, tear out my hair and burn my fingers, all while going up the wall and round the bend. Methinks I need that infinite life poke more than Bigfoot does.

This is a proposed site for a bijou-pokette from Daniel Hockney in Clifton. His letter really made an impact. In fact it made Impact much more enjoyable, as he's listed all these passwords from it. You wanna look? Ok then, as it's Christmas, but it's just something about a crow running out of the door with a prayer book and then falling off the edge of a gate:

Frame 10	AMEN
Frame 20	BOOK
Frame 30	CROW
Frame 40	DOOR
Frame 50	EDGE
Frame 60	FALL
Frame 70	GATE

Back to Graham again, and this is not the last pokette Graham has in store for you. He has also released to, what they call in Zummerzet "furrin' parts", a complete load of cobras.

Hang on, I think that's meant to say "something to help you win at Cobra." Yes, that sounds more like it. Here's his best stab at Cobra Force, anyway. You type it in, I'll have another festive biscuit, and an equally convivial glass of brandy:

```
1 ' Cobra Force -tape-
2 ' By Graham Smith
3 ' Infinite lives
4 '
10 DATA c4,14,ac,af,32,c2
20 DATA 6f,fb,c9,3e,8f,32
30 DATA 7f,41,3e,b3,32,cc
40 DATA 41,21,5c,46,36,72
50 DATA 2b,36,b0,2b,36,89
60 DATA c3,05,40
70 FOR j=0 TO 32:READ a$
80 x=VAL("&"+a$):y=y+x
90 POKE j+48640,x:NEXT j
100 IF y<>3511 GOTO 130
110 MEMORY &3FFF:LOAD"
120 CALL 48649
130 PRINT"EATA DRROR
```

Good biscuits those, Suz only makes them for Christmas. Not making you feel hungry, am I? Are you after something you can really get your teeth into? Are lives a bit fin on the ground? I've just fished a poke out of the mailbag for "Shark." Should keep you going while I dive into the biscuit barrel:

```
1 ' Shark -tape-
2 ' By Graham Smith
3 ' Infinite lives
4 '
10 DATA 2a,5b,bb,22,17,01
20 DATA 21,5a,bb,36,c3,23
30 DATA 36,12,23,36,01,c9
40 DATA af,32,81,3e,cf
50 FOR j=0 TO 22:READ a$
60 x=VAL("&"+a$):y=y+x
70 POKE j+256,x:NEXT j
80 IF y<>1958 GOTO 100
90 CALL 256:RUN"
100 PRINT"You missed a bite
```

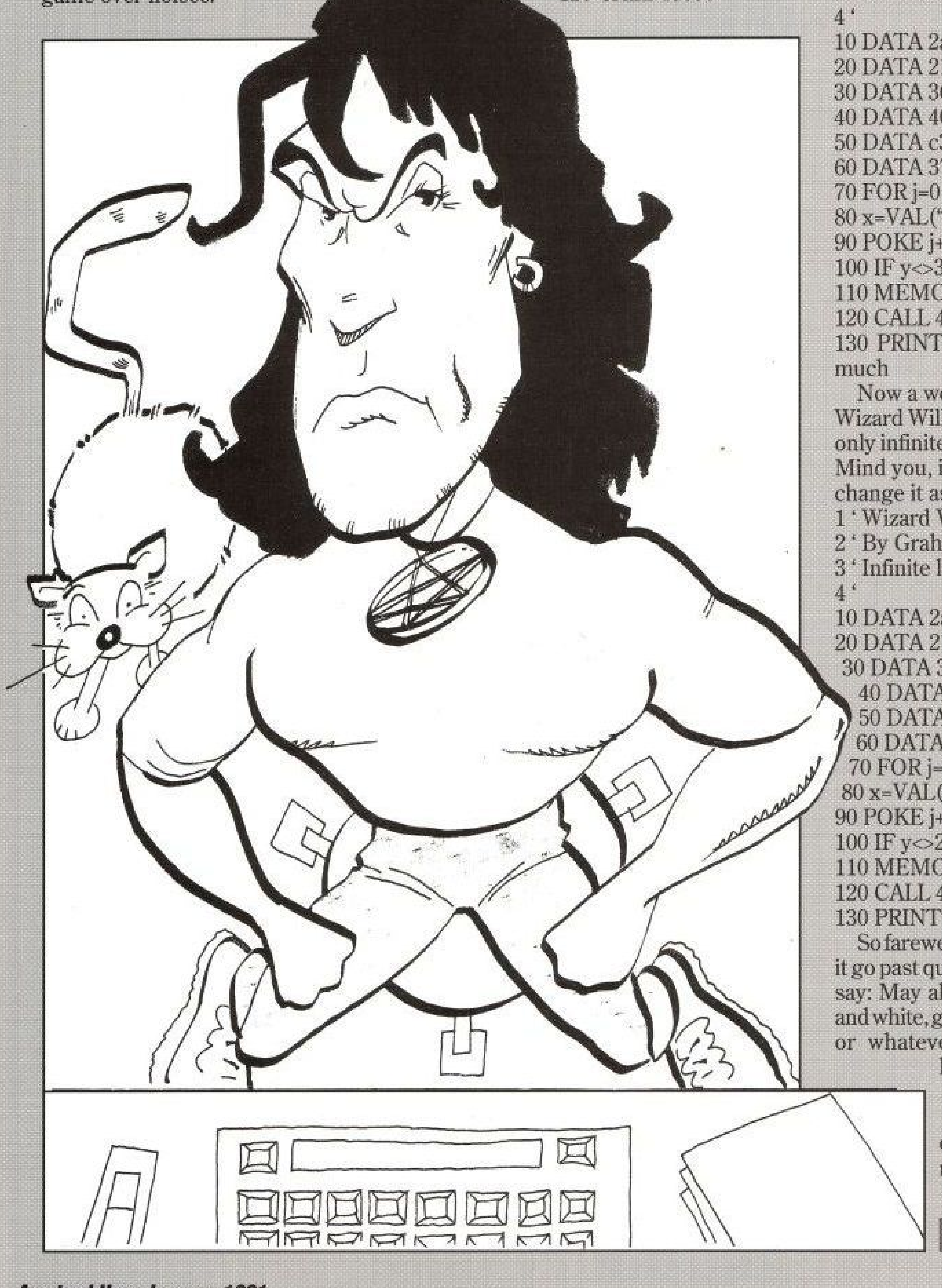
Next on the conveyor belt tonight, we have infinite lives, and infinite ammo for Moving Target. With this kind of help, you couldn't do better if someone was pointing a gun at you:

```
1 ' Moving Target -tape-
2 ' By Graham Smith
3 ' Infinite lives
4 ' Infinite ammo
5 '
10 DATA c4,14,ac,3e,63,32,c7
20 DATA 81,af,67,6f,32,cf,64
30 DATA 32,36,6b,32,4c,6b,22
40 DATA 4d,6b,fb,c9,3e,8f,32
```

```
50 DATA 7f,41,3e,b3,32,cc,41
60 DATA 21,62,46,36,92,2b,36
70 DATA 83,2b,36,df,c3,05,40
80 FOR j=0 TO 48:READ a$
90 x=VAL("&"+a$):y=y+x
100 POKE j+48640,x:NEXT j
110 IF y<>5007 GOTO 140
120 MEMORY &3FFF:LOAD"
130 CALL 48665
140 PRINT"Missed! – DATA ERROR
```

And now a game for the ex-moving targets – Spooked. This wee pokeykins stops your christmas spirit from being snuffed when the time runs out. Now there is an even greater period of silly music between the game over noises:

```
1 ' Spooked -tape-
2 ' By Graham Smith
3 ' No loss of life when
4 ' time runs out
5 '
10 DATA c4,14,ac,3e,c9,32
20 DATA ab,26,fb,c9,3e,8f
30 DATA 32,7f,41,3e,b3,32
40 DATA cc,41,21,62,46,36
50 DATA 92,2b,36,83,2b,36
60 DATA df,c3,05,40
70 FOR j=0 TO 33:READ a$
80 x=VAL("&"+a$):y=y+x
90 POKE j+48640,x:NEXT j
100 IF y<>3582 GOTO 130
110 MEMORY &3FFF:LOAD"
120 CALL 48650
130 PRINT"DATA ERROR
```



Have fun with that one, but as the big ghost said to the little ghost,"don't spook unless you're spoken too." Mind you, I'm fond of spirits. Where'd I put me christmas brandy?

Graham Smith's penultimate offering this year is for Super Tank Simulator. It gives you infinite lives, and probably plugs the leaks and lags the tank as well. Wonderful stuff, this modern technology. Shame people have to spend so much time chucking it at one another:

```
1 ' Super Tank Simulator
2 ' By Graham Smith
3 ' Infinite lives
4 '
10 DATA 2a,38,bd,22,20,be
20 DATA 21,37,bd,36,c3,23
30 DATA 36,1b,23,36,be,21
40 DATA 40,00,e3,11,00,bb
50 DATA c3,4a,3a,af,32,f6
60 DATA 37,cf
70 FOR j=0 TO 31:READ a$
80 x=VAL("&"+a$):y=y+x
90 POKE j+48640,x:NEXT j
100 IF y<>3052 GOTO 130
110 MEMORY 14900:LOAD"
120 CALL 48640
130 PRINT"Data Error – Tanks very much
```

Now a weally wonderful wheeze for Wizard Willy's wellbeing. The one and only infinite life poke for Wizard Willy. Mind you, if I had a name like that. I'd change it as quick as a flash!

```
1 ' Wizard Willy -tape-
2 ' By Graham Smith
3 ' Infinite lives
4 '
10 DATA 2a,38,bd,22,20,be
20 DATA 21,37,bd,36,c3,23
30 DATA 36,1b,23,36,be,21
40 DATA 40,00,e3,11,00,bb
50 DATA c3,4a,3a,af,32,1c
60 DATA 1c,cf
70 FOR j=0 TO 31:READ a$
80 x=VAL("&"+a$):y=y+x
90 POKE j+48640,x:NEXT j
100 IF y<>2807 GOTO 130
110 MEMORY 14900:LOAD"
120 CALL 48640
130 PRINT">Poof!< Data error
```

So farewell for 1990, hackfans. Didn't it go past quickly? Before we go, let me say: May all your christmas be merry and white, green, true blue, deep purple, or whatever other hue makes you happy.

Love 'n' a Merry Crimbo,
Vax, Suz, Kate, Tammy, 2 cats, 5 rabbits & a red-nosed reindeer, I mean editor.

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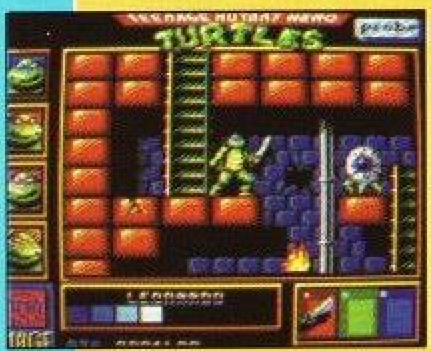
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TELEPHONE NO..

More power to your Pizza arm as the ACU team joins the Turtles under the Big Apple, joins Flimbo to save beloved Pearly and takes the Nanchukus out of the wardrobe to take on Kanitoki in Ninja Remix.

GAMEPLAN



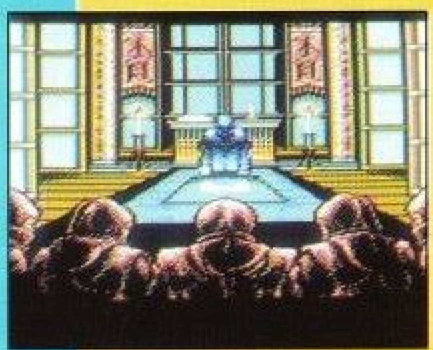
TEENAGE MUTANT HERO TURTLES

Conquer the maniacal Shredder Cowabunga style with the heroes in half shells.



FLIMBO'S QUEST

Save Pearly from the twisted professor, but do it quick before time runs out for good.



NINJA REMIX

Epic Oriental action in the remake of a classic.

PLUS

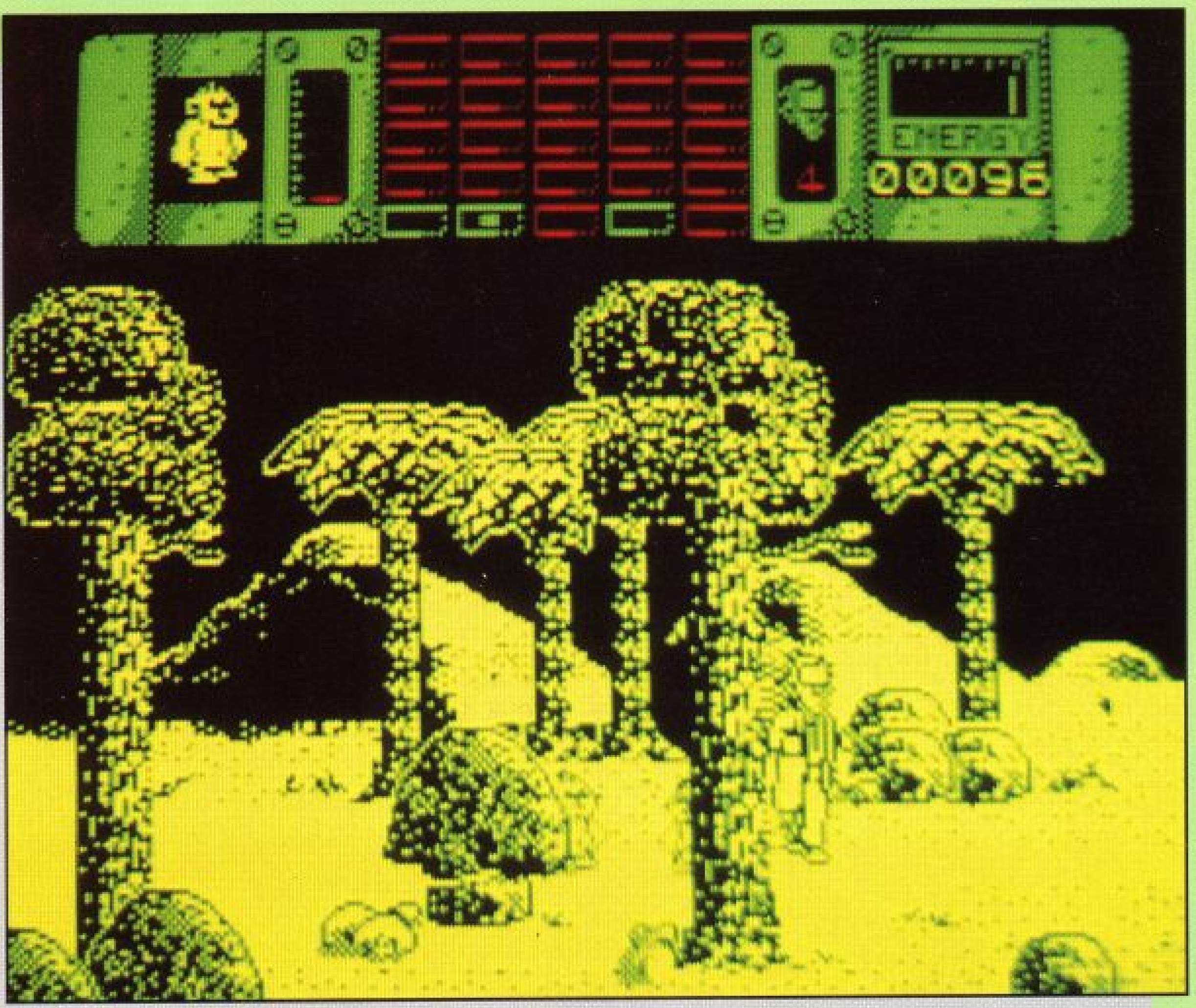
Two whole pages of fantastic console action in development with Ocean, Time Machine, Sim City and more jewels from the realm of the Budget Zone.

TOP 20

1	(1)	Quattro Adventure	Code Masters
2	(4)	Rastan	Hit Squad
3	(5)	Paperboy	Encore
4	(NE)	Guardian Angel	Code Masters
5	(NE)	Quattro Combat	Code Masters
6	(NE)	Run the Gauntlet	Hit Squad
7	(NE)	Quattro Super Hits	Code Masters
8	(6)	Big Trouble in Little China	Alternative
9	(8)	Shadow Warriors	Ocean
10	(2)	A Question of Sport	Encore
11	(13)	The Munsters	Alternative
12	(10)	Hong Kong Phooey	Hitec Software
13	(9)	Daley Thompson's Olympic Challenge	Hit Squad
14	(12)	Pro Golf	Atlantis
15	(11)	Salamander	Hit Squad
16	(3)	Pro Boxing	Code Masters
17	(NE)	Wombles	Alternative
18	(17)	Match Day 2	Hit Squad
19	(NE)	Live and Let Die	Encore
20	(7)	Temple of Doom	Kixx

Time Machine

Join Professor Potts in the epic race against time to save the future from the past



There you were outside your laboratory, minding your own business as you made a few minor alterations to your Time Machine when, suddenly and out of the blue, you are attacked by a bunch of mindless terrorists. An explosive device detonates beside your beloved machine, the vital accelerator crystal is destroyed and you find yourself thrown into a vicious time warp, leaving you stranded 10 million years in the past with only a souped up torch for inspiration.

Quite a pickle indeed. In this superb four dimensional blast from Activision, you play the role of scatty-brained Professor Potts, an obsessive time traveller and typical eccentric.Your task is to single-handedly drag your way back through the ages and prevent the terrorist attack before it even happened but be warned, it's no easy task.

In each of the time zones you pass through, be it prehistoric, medieval or recent, you need to perform a number of tasks by interfering with evolution to create the next zone you must visit.

Use your skill to determine what needs doing, it might be as simple as heating or cooling the planet to allow life to develop, although your duties get harder as you go on. Mess up and you could find life as we know it disappearing without trace. Quite a responsibility.

Many of your actions in the time zones will effect what you find on the next, so, as they say, you can only reap in the future what you have planted in the past. Very philosophical.

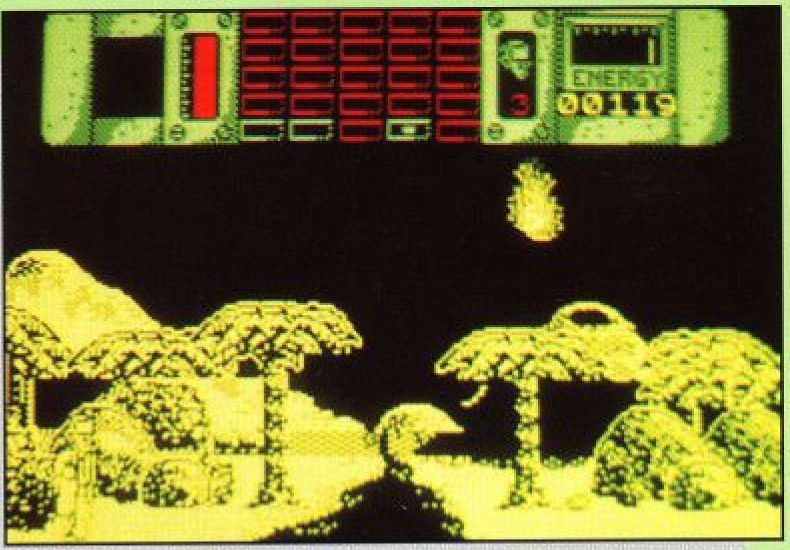
Along the way, you must keep your eyes open for clues at all times and use whatever you can lay your hands on to help your quest. Your only weapon is a designer torch, which emits a limited burst of electrical power. Use this to stun any foul looking creatrues and also to dislodge objects which may come in useful. Don't overuse it though, as it may take some time to recharge.

Once you've completed your tasks, you can use a limited number of reusable travel pods to skip backwards and forwards, taking care to look after your ancestors and environment to see your way back to the day of the dreaded terrorist attack.

Although there may be some lack of colour in the early stages of the game, that is more than compensated for by the epic scale of the gameplay and the addictive puzzles to be found throughout.

Time Machine is an excellent example of role-playing arcade adventure and is guaranteed to keep you glued to your screens for hours on end as you fight for the future in the epic confines of the past.

John Taylor



ROUND-UP			
NAME	Time Machine		
FROM	Activision	PRICE	Disc £14.99 Cassette £9.99
78%	81%	87%	
GRAFFIX	SONIX	PLAYABILITY	VERDICT

NINJA REMIX

Test out your Nanchukus as Last Ninja II gets a revamp.



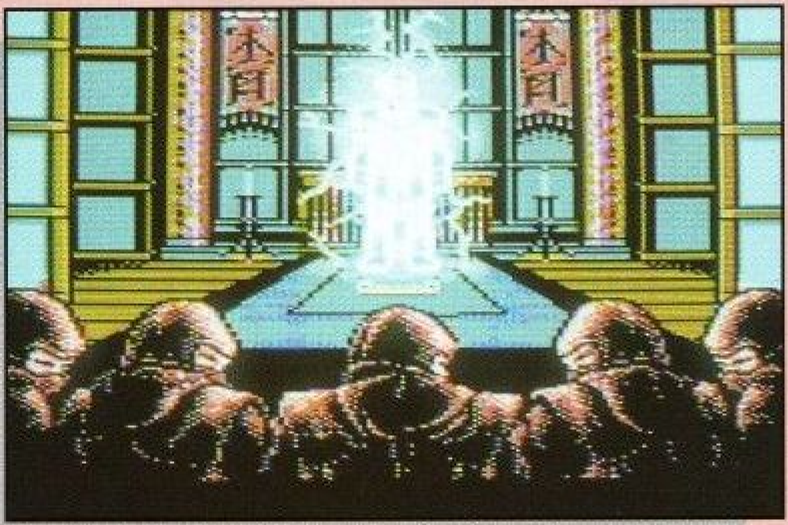
Hands up who remembers that masterpiece of oriental artistry Last Ninja II? I wouldn't mind betting there's a fair few of you out there who do, because games of that quality have a tendency to hang around on your all time fave plays list.

Anyway, those that do remember it, be prepared for an absolute knockout with this updated version of the classic and those that don't? Well, you're in for a real treat too.

Switch on the machine and run the game and the first thing you'll notice is a totally new opening sequence. Yes, this is your CPC you're looking at and yes, the fully animated sequence is brilliant.

There you are, sitting amongst your fellow Ninjitsu in ancient Japan, the candles flickering in the background, when suddenly, the force hits you, dragging you forward in time to present day New York, to take on your eternal adversary, the evil Kanitoki.

With the actual gameplay of the original being of such a high standard, the programmers at System 3 have had the foresight not to tamper too much with it, leaving the storyline pretty much as it was.



Starting off on the bandstand of New York's Central Park, your mission is to work your way through seven deadly levels of oriental mayhem in varied locations throughout the city, on your way to Kanitoki's secret hideaway.

Basically, you'll need to utilise everything you can lay your hands on to beat off the bad guys, whilst picking up keys and other objects strewn around to make your way to the final showdown.

Controlling your character took some getting used to in the original game, but by implementing an excellent new dual joystick option, you can choose which option suits you best in combat.

Another enhancement is the total overhaul of your status panel, giving a full colour frame within a frame aspect which greatly enlivens your viewing area. If you are unfortunate enough to lose a life, you also get a nicely animated sequence displaying your remaining lives.

Throughout the game, new music and sound effects also give the action a much more lively feel, while improvements to movements give your character a very true to life walking and running action, without the usual impression of sliding.

All in all, Ninja Remix is a perfect example of making a good game even better. The improvements, without detracting from the original scenario and excellent graphics, combine to produce a superb new product that is value for money even if you have got Last Ninja II. If you haven't got the original, then the Remix is an absolute must, if only for the stunning opening sequence which probably forms a first on the CPC and should well start a trend.

Chris Knight

ROUND-UP

NAME	Ninja Remix		
FROM	System 3	PRICE	Disc £14.99 Cassette £9.99
88%	85%	92%	
GRAFFIX	SONIX	PLAYABILITY	VERDICT

A Drop In The Ocean

Andrew Banner heads up North to see what Ocean has got up its sleeves on the console Front, with spectacular results.

Since Amstrad announced the cartridge based GX4000 and new CPC Plus ranges, software houses have been eager to write new games to utilise the extended facilities of the new machines. One of the highest contributing factors towards the success of the new range is it's cartridge port – after all it's instant, it's small and compact, it's difficult to damage it and you can't copy it.

Ocean were one of the first software houses to jump on the bandwagon, and why not. This Christmas will see more console sales than the early eighties, and a large portion of these will be one of the three new Amstrad machines.

Ocean have a torrent of cartridges for the coming months including the conversion of arcade games, Pang, Special Criminal Investigation (Chase HQ 2) and Toki.

Further games include the infamous Robocop II. Anyone who has seen the film will know the plot and will also know just how appalling it is. Anyway, a ruthless drug baron has designed a narcotic that's in greater demand than the electricity shares; nuke. Simply inject this stuff into your bloodstream for instant paradise. The guy behind the warhead sounding pleasure drug is Cane, a person who wants to see "made in America mean something again". Anyway, without giving too much away, Cane's brain ends up in Omni Consumer Products' (OCP) new baby, Robocop 2. This thing's got more firepower than Arnold Schwarzenegger and Sylvester Stallone put together and is as ugly and unhumanlike as Margaret Thatcher. Come to think of it, it's policing policies are similar as well. So what has Robocop 2 got going for it? Well, if we're talking film, absolutely nothing except Action man armoured cars. Talk about the game and it's a different matter.



Robocop was the best selling computer game of all time with a success story of 32 weeks at the top of the all formats charts. Not bad. Robocop 2 is much of the same thing though and I doubt whether it will do as well, but it is a hard act to follow. Platform games rarely hold my interest for long, but I have to admit that Robocop 2 is addictive in a "I wonder what comes next" way.

In a graphical sense, Robocop 2 is great. Good, vibrant colours, realistic movement and scrolling. Well, the scrolling isn't that good. Technically it's alright, it's just that the screen doesn't scroll with your sprite. Instead, it scrolls when it needs to and stops the action at that point until it's finished. This is fine once you've got used to it, but it does throw you off a bit at the beginning. Bonus levels have you trying to reconnect your memory banks in order to remember your former wife, this ain't too easy considering you're physically dead! And once again, Robocop is in the firing range, readjusting his sights. This is damned difficult if you're using a controller pad.

Robocop 2 has all the makings of a hit though, especially if the first is anything to go by.

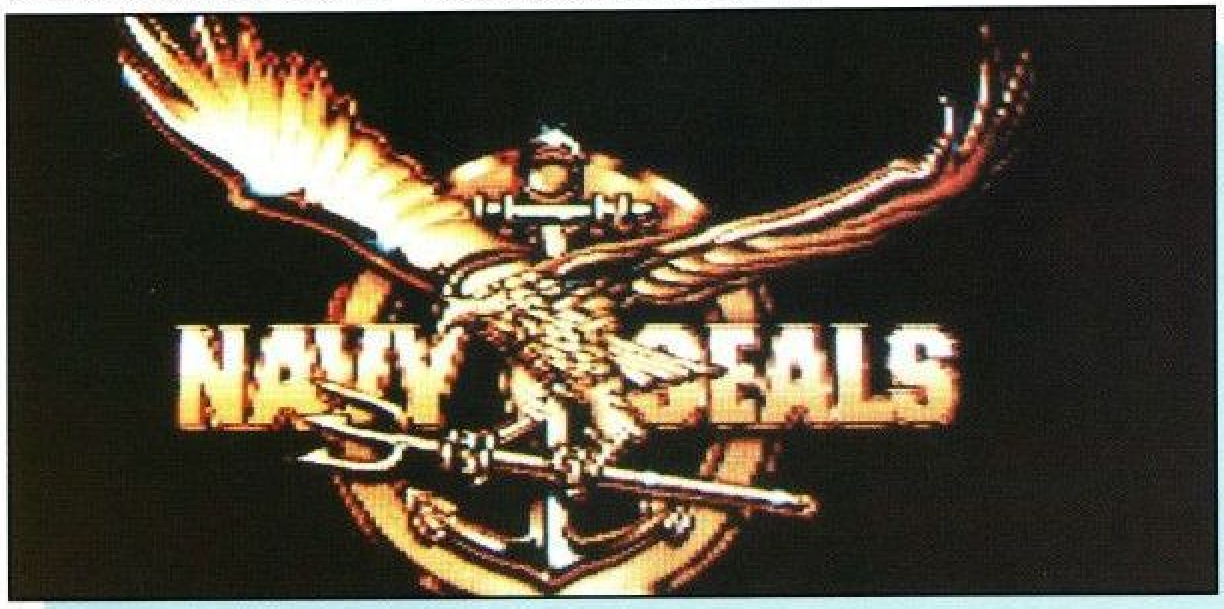




Plotting is an appropriate name for a game such as this. Your next move is vital to the completion of the level and so plotting it is highly important. The objective is simple; lots of bricks (of which there are four types) are jumbled up in a pile, all you have to do is eliminate them – a piece of cake!

Oh, you want to know how? Well, Ok but you'll need your furry friend to help – we'll call him fluffy. Fluffy throws bricks at the pile of bricks. Simply aim a brick at another in the pile and provided it's of the same type, both disappear and the brick directly behind the one that was previously in the pile is thrown back at you for your next move. The trick is to plan ahead and so you don't get caught out.

What's really special though is the two player option. Simultaneous play using a slit screen display puts an end to those long boring periods between player's turns. Another feature of the game is the screen designer which you can use to create impossible levels or ones that are so easy that you don't even need to think about it. Whether you've got a brain or not though, Plotting is damned addictive.



The movie stars Charlie Sheen from Platoon and Michael Biehn from Terminator, the game stars-you. Navy S.E.A.L.S. on the big screen is due to be released in February 1991, but Amstrad users will be getting the game long before that.

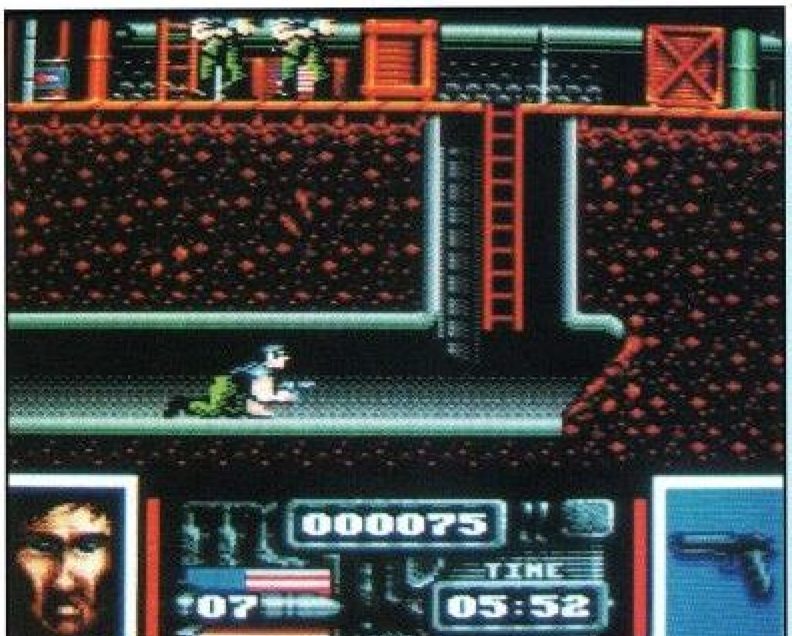
The S.E.A.L.S. are a crack squad totalling five who have been assigned to rescue the pilot of a U.S. chopper that's been shot down in the Gulf. There are lots of Arabs in this game and the only thing to do with Arabs is to shoot 'em, especially in the light of recent world events. Did you know it costs me £30 to fill my tank up!!

Anyway, the pilot is rescued safely but in doing this the team discover a number of air to surface "stinger" missiles. It's decided that these missiles pose a serious threat to American lives and a plan is made to destroy all the stocks that have been accumulated...

A scrolling platform adventure unfolds. Boasting colourful and detailed graphics, Navy S.E.A.L.S. has a number of clever acrobatic movements including climbing on crates and hanging from beams and moving along them. It's enough to make your arms ache just watching it. Not only that but you can flip up onto the beam from a hanging position to get to those platforms that have no ladder.

Seven levels of action make Navy S.E.A.L.S. a game to look forward to. The film apparently flopped in America, but with prospects of a few dead Arabs and petrol rationing, I'm sure it's gonna be a box office smash over here. As for Ocean's game, all I'm saying is that it's brilliant.

Andrew Banner

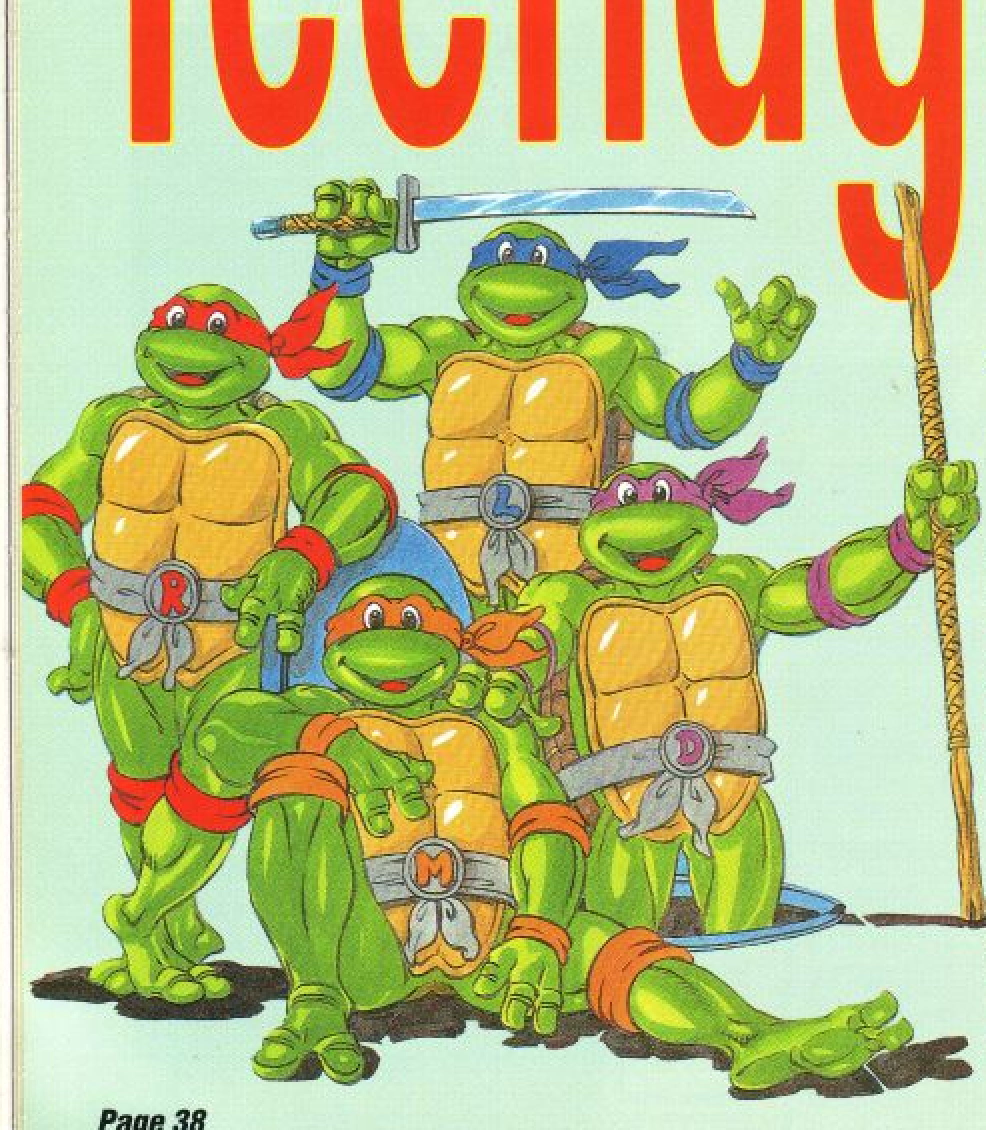




There's no denying that Christmas time this year is Turtle time. You've seen the comic, poster, keyring, model...the list goes on and to wrap it all up perfectly in time for the Festive Season, clear your CPC screen and be prepared for a megablast of epic proportions in the shape of those four classic heroes from beneath New York City.

Set over six epic levels of horizontal scrolling, your quest is to rescue your dear friend and ally, April O'Neil, from the maniacal clutches of the evil Shredder. Along the way, be prepared for some dazzling graphics displays and some pretty gruesome opposition, in bo human and animal form.

Teenage Mutan



Cowabunga! Time to take to the streets with those awesome heroes in half shells.

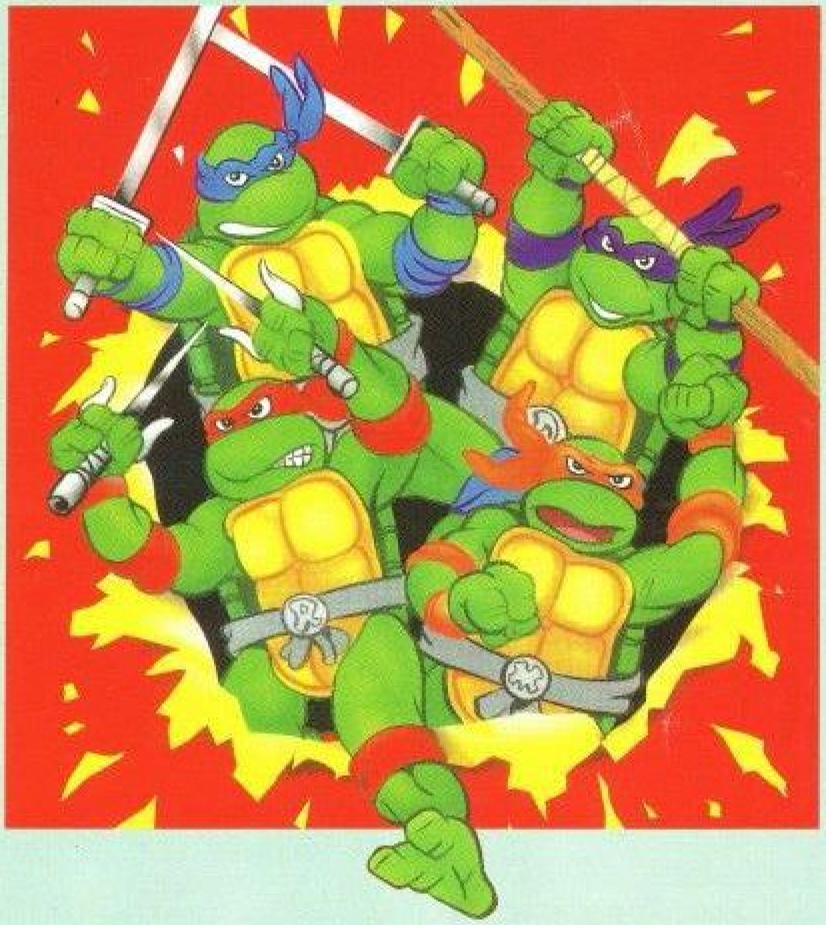
Rumbling through some pretty nasty quarters of the Big Apple, your main worry will be warding off the hordes of Ninjitsu warriors, blood descendants of the deadly Foot Clan. Master control of your weaponry and take the battle straight to them.

Underneath the walkways, the adventure takes you deep into Mouser territory in the sewers, while other criminal vermin will pop up in the underground rivers as you try to locate the secret



sewage passages that will take you finally to Shredder's lair.

To make matters just a little harder, you have to control each of the Turtles in turn, to make sure they keep up with the action at all times-no easy task. Whether you pick Michelangelo, Raffael, Leonardo or Donatello, be sure to pick wisely and match their individual strengths against the ever changing enemy.

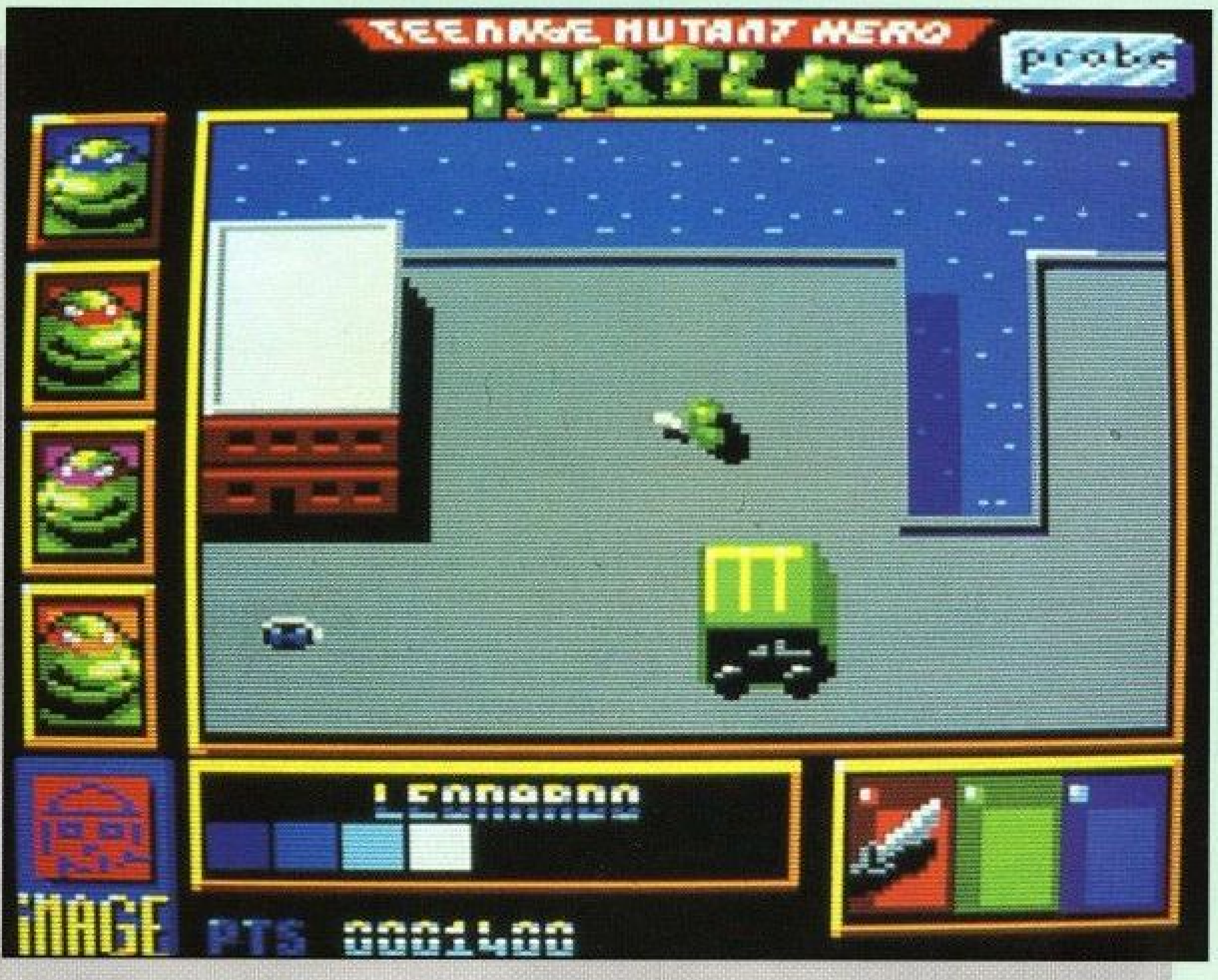


Each of the separate locations within the game are totally different with their own distinct atmosphere, allowing you to really get into each of the hero's styles and weapons usage. This interchangeability brings a whole new dimension to the old scenario of rescuing the damsel in distress and, if you do manage to locate the correct path through to Shredder's secret hideaway, be prepared for some hell-for-leather fighting if you want to bring April away with you.

In case you hadn't already realised, Shredder is one tough dude and you'll need all your wits about you as he comes in for the attack. Don't worry, you'll know him when you see him, he's the big guy with the ugly mug hidden by the mask.

If you do see him, knock

nt Hero Turtles



him on the head for me as well, nasty character!

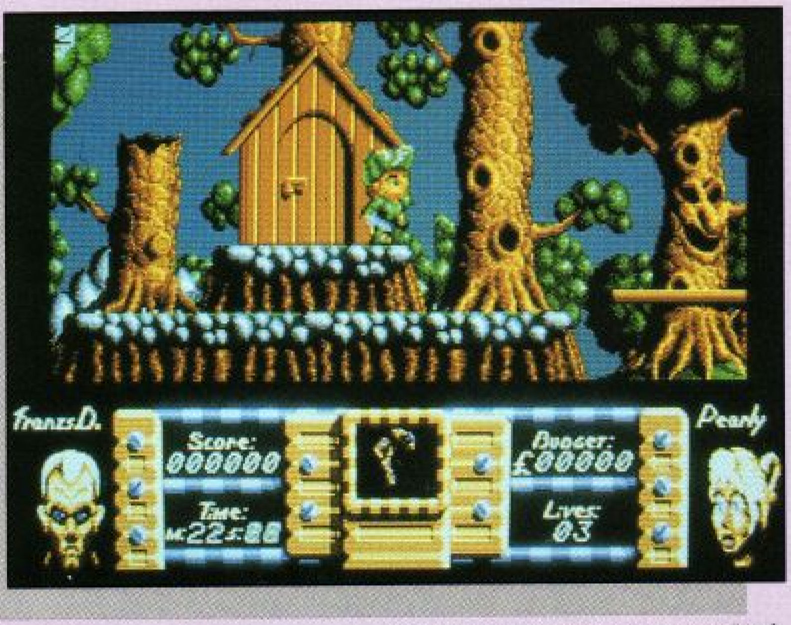
Teenage Mutant Hero Turtles the computer game is going to be as big, if not bigger than the movie. The gameplay looks superb and with the interchangeable Turtles option, the variety of action is dramatic, making this game a sure winner for the Festive Season and one that's going to be well 'ard to knock off the top of the charts. Go out and get it as soon as you get a whiff of it near the shops, dudes.

Dave Peach

Teenage Mutant Hero Turtles
Image Works
Disc: £14.99
Cassette: £9.99

There's something decidedly fishy going on in Dewdrop Land. Gormless zombies are roaming the countryside amongst dragons, giant snails, mutated butterflies and other abominations of creation.

Who's behind all this? The twisted professor of course. Fascinated with his own dreams about creation, he has transformed this once peaceful place into a monsters' playground and now he wants to go one step further.



FLIMBO'S QUEST

The gauntlet is down. Dare you pick it up to save your beloved Pearly?

With his latest horrific experiment, the secret of eternal youth is within his grasp, but he needs the blood of a nubile young woman for it to succeed and this is where you get involved.

Pearly, your best girlie, has been kidnapped and it's up to you to save her from a fate worse than death over six levels of epic derring-do against the clock.

Now, anybody who dismisses Flimbo's Quest as a cutesie-cutesie platform jumpy and not for serious minded games players, had better think again. As an arcade style adventure, this blast is going to be very hard to beat.

The graphics, which have been designed with console play in mind, are visually stunning, the backdrops are impressive and varied and control of Flimbo through the screens is very easy indeed, with the chance to change direction mid-jump and extremely smooth scrolling.

To save your beloved Pearly, you will need to locate letters to passwords, which are held by baddies highlited on your status area. When you shoot the baddie, take the scroll back to your only ally, Baz the Magician, at the shop and hand it over.



The idea, of course, is to complete the password and so progress onto the next level.

In the shop, you can also purchase numerous weapons, extra time and, if you are lucky enough to have plenty of money, the whole password.

As you shoot down the ugly beasts in your way, be sure to pick up any money you find, as well as the hearts. Shoot these to change their colours and collect five to gain a much needed life.

As in all adventure games, be prepared to investigate any leads you can find. Closed doors can lead you into a veritable gold mine, but you'll also need to take care as you pry into the backdrops; there are some pretty scary giant monsters lurking around.

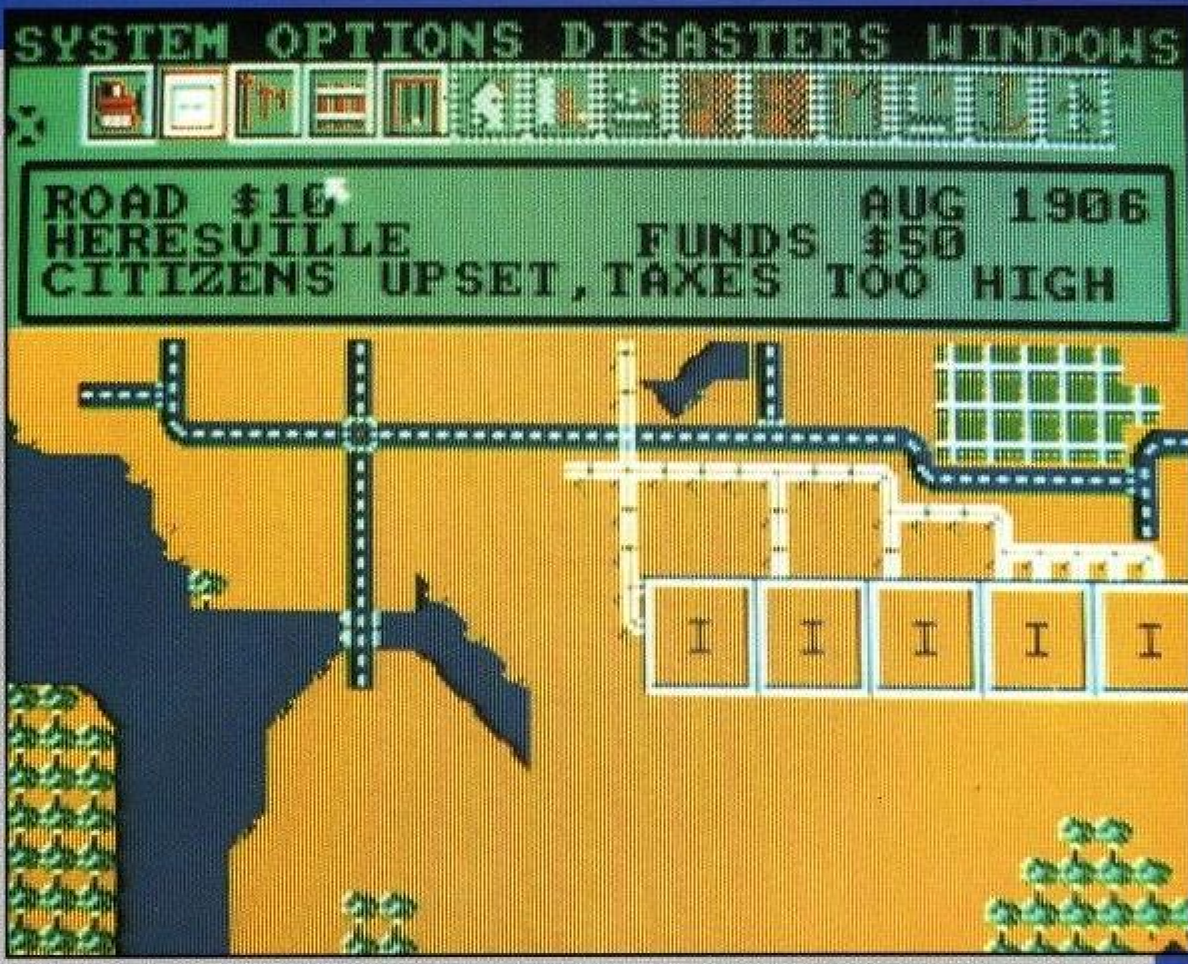
The gameplay of Flimbo's Quest is excellent-not too hard to start with and by no means easy as you progress through the vastly different levels on your way to the skeleton filled castle at the end. Be sure to make good use of the shop on each level, especially to buy the special weapons on display as the monsters do get harder to deal with as you go on.

As with many of the offerings from System 3, Flimbo is going to be a guaranteed classic. Its originality, graphics, varied sound effects and ease of controllability make it totally addictive and, by utilising more screen space, you get a much larger playing area to boot.

If you're looking for that extra special game to see you through Christmas this year, try Flimbo-he won't let you down.

Chris Knight

ROUND-UP			
NAME	Flimbo's Quest		
FROM	System 3	PRICE	Disc £14.99 Cassette £9.99
90%	86%	96%	GOLD
GRAFFIX	SONIX	PLAYABILITY	VERDICT



SIM CITY

Crime is rife, the residents are leaving in droves. What now, Mr Mayor?

Have you ever sat back and wondered what it must be like for developers of new towns like Milton Keynes? I mean, you can't just come around a corner, see a nice spot of land and think: "Hmm, that'll do nicely. We'll stick a few concrete cows in that field over there and we'll be a thriving community in no time."

No. In order to create a self-contained urban development, capable of supporting itself and trading on an external market for profit, there are a fair number of problems that need to be considered, none of which can be successful unless they are considered in conjunction with others.

Am I making sense? Who knows. Anyway and basically, if you fancy becoming a renowned town planner, then you'd better get hold of Sim City, a particularly brilliant simulator that'll help you get to grips with everything you need to know about putting your name on the map.

To start off, choose your level of difficulty. This will determine how much money you can spend on your city to start with and then choose between an existing terrain or create your own.

Clear some land, lay a ring road to surround your city and then get started on laying out the residential areas. These, of course,are where the Sims will live but, in order to keep them there, you now have to provide commercial shopping areas, where they can buy their daily bread, industrial areas, where they can work and some all important power stations to light up their lives.

All pretty basic stuff, you might thing, and so it is. Building your first city may seem a piece of cake, but the skill factor comes in when you try and make it survive.

What about getting your people to work? Better build some good transport systems. What about rising crime? A few police stations should help. Then there's fire, natural disaster and, of course, setting taxes to make your profits.

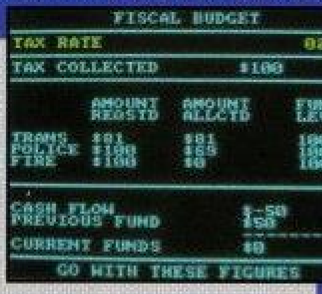
Before you know it, things start getting incredibly complex. Getting your variables right will mean the difference between a booming population, happy with their surroundings, and a pollution-rife ghetto, where no self-respecting citizen would like to bring up his or her kids. The decisions are yours.

Use your money wisely and be careful to set up good ratios between zones, especially when it comes to transport and policing. If you manage to develop your city, you could even consider a seaport or airport to boost revenues, but beware of the cost. Pay attention to your citizens gripes at the end of each year as well; keep them happy and your city will continue to thrive.

Using easily controlled icon menus, Sim City is an incredibly complex simulator which you can leave and come back to as you choose. Develop city after city, experimenting with different factors each time to find out the best results. Remember, a well laid out, smaller city, with lots of lovely parkland, will attract more people than a massive urban sprawl and bulldozing for redevelopment costs money you could well afford not to spend.

If you do get fed up with one of your cities, why not try a little natural disaster to spice things up? You can make these things happen, but it's the poor Sims who have to live with it, so create the right conditions for them and they'll do you proud.

Sim City is an excellent offering; totally addictive and full of surprises for the novice developer. If you're looking for something totally different on the games scene, go and buy it now.



John Taylor

ROUND-UP

NAME	Sim City		
FROM	Infogrames	PRICE	Disc £14.99 Cassette £9.99
80%	78%	88%	
GRAFFIX	SONIX	PLAYABILITY	VERDICT



Budget Basement

Five more intrepid adventures into the budget zone.

MACADAM BUMPER

Pinball freaks eat your hearts out and make sure you get this one in for the Festive Season. Featuring all the normal thrills and spills of pinball simulators, this little gem also lets you design your own table, so you can make the game as devilish or as easy as you like with an easy to use icon driven menu system.

Using the existing parameters, you can get up to four players on any one table and even TILT to make the most out of your play, just like the real thing.

To make matters even better, just about all of these parameters can be altered, giving you extra elasticity on the cushion bands and bumpers, extra spring on the ball release and you can even increase the speed of the ball.

Chuck in your coins, set up your challenge and get set for some of the smoothest pin action in town.

TIGER ROAD

If you're into beat-em-ups, Oriental style, then get set for some superb action as you take the battle to the evil Ryu Ken Oh.

As Lee Wong, your quest is to save the children, kidnapped by the old rogue, to be brainwashed into his evil minions. On your way to Ken's fortress, take on some awesome opponents in the form of Samurai Warriors, giants, dragons and a whole host of other obstacles in a fast and furious game that is totally addictive.

Bringing this Capcom classic onto a budget label makes Tiger Road incredible value for money, being one of the best martial arts blasts of all time.

To survive the gruelling levels, you'll need to be quick indeed, so forget the marvellous scenery and concentrate on what you do best-dealing out death in large quantities.



THE BOXER

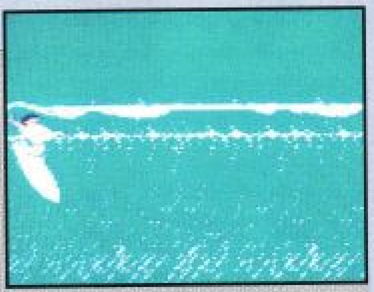
Here's something for strategy and management fans in the form of the latest youngster to break into the world of Pro Boxing. Yep, it's your job to take care of him and see that he gets a pop at the championship title.

A brief glance at the option menus will tell you there's an awful lot to this game, from training, through fight arranging to placing of bets. It really is all up to you.

Be sure to vet prospective opponents as your boy will very soon get disheartened if you outmatch him. Remember, a steady climb will help your income and get your prize fighter in the right frame of mind to challenge for the title.

There are an incredible 10 levels of play in The Boxer, so you'll need to make use of the save/load option to make the very most of a protracted career as you go all the way to the top.

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CALIFORNIA GAMES

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OK, most of the sports listed above will be known to you already, but some of you may well ask what on Earth Foot Bag and Flying disk are all about. Well, Flying disk is a fancy term for Frisbee throwing and Foot Bag, hmm, basically you just throw a bag in the air and try and keep it up there as long as possible by kicking and head butting it.

Well, we all knew Americans could be weird, but never mind. The graphics and sound effects are superb, combining to give a real feel for the West Coast and the action is both varied and dynamic, making the games one of the best buys you can get on a budget label.

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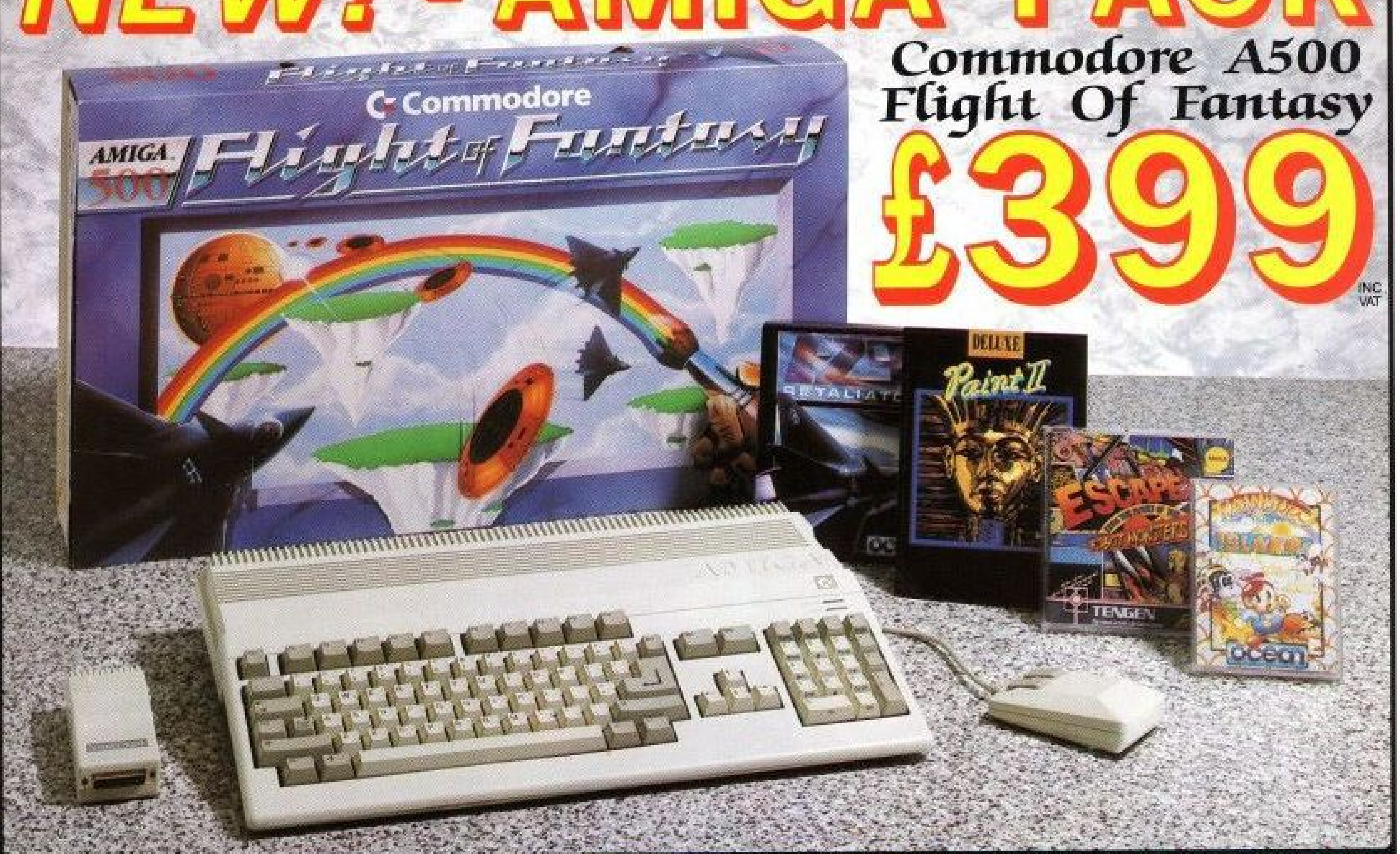
Solar Empire is a marvelously devised game with a wonderfully smooth 8 way scrolling galaxy to run through and some excellent goodies to pick up along the way. If you want to boldly go etc..., then pick up Solar Empire now.

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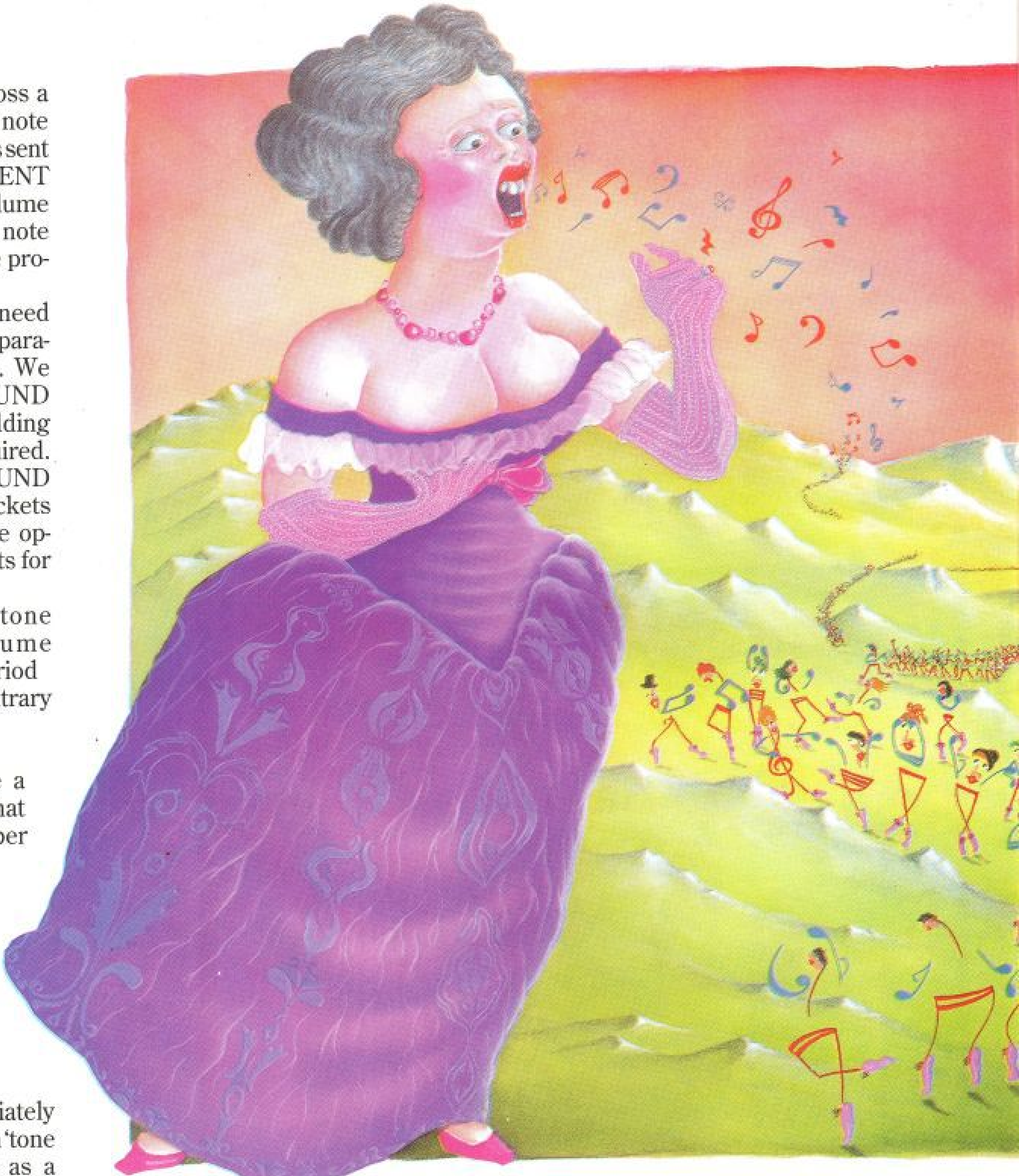
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Attenshun!!

In which Ian Waugh puts the Sound Command in its place along with some other ranks and files of the CPC music world

The SOUND Command

When BASIC comes across a SOUND command, the note information it contains is sent to the sound chip. The ENV and ENT commands merely alter the volume and pitch characteristics of the note and have no part in its immediate production.

In its simplest form, SOUND need only be followed by the first two parameters but it can take up to seven. We can experiment with the SOUND command quite comfortably, adding extra parameters only when required.

The User Guide lists the SOUND parameters using a series of brackets to indicate which parameters are optional. I have omitted the brackets for clarity.

SOUND channel status,tone period,duration,volume,volume envelope,tone envelope,noise period

They are also given rather arbitrary single-letter names:

SOUND G,H,I,J,K,L,M

As these don't pretend to be a mnemonic aid I would suggest that the following is easier to remember and refer to:

SOUND C,P,D,V,VE,TE,N

C: Channel P: Pitch
D: Duration V: Volume
VE: Volume Envelope TE: Tone Envelope N: Noise

Pitch versus tone period

I also feel that 'pitch' is immediately easier to understand than the term 'tone period' which suggests, to me as a musician, a note duration. Likewise, 'tone envelope' suggests that it might affect the waveform in some way when in reality it modulates the pitch. In an attempt to minimise any possible confusion I will normally refer to the second SOUND parameter as pitch and most variables holding pitch information will be called pitch or note. The tone envelope, however, I will continue to refer to as the tone envelope. Its use is far less likely to cause confusion and it can be expressed in a variable as {bold}te{normal} or {bold}et.{normal}

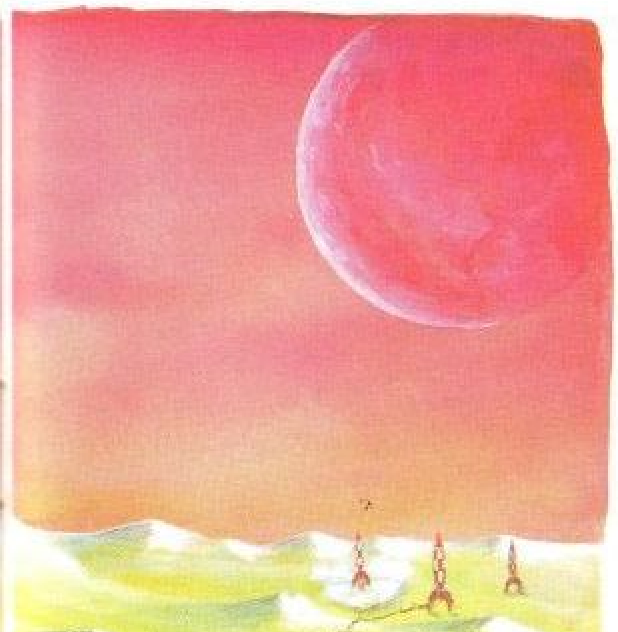
Sound queues and buffers

When a SOUND command is issued, it places the note in a queue in a sound buffer and immediately passes control back to BASIC. Each channel has its own buffer which can hold four notes while a fifth note is playing. If a buffer is full the SOUND command will be unable to process its instruction and the program will halt until a space appears in the queue.

For reference, Figure 3.1 lists the SOUND parameters along with the range of values they can take. Some of the values set special conditions so we'll look at each one in turn.

C: Channel Status

This takes a value in the range 1 to 255. There is no default, a value must be included. The sound chip contains three sound channels and this parameter selects which channel or channels are to be used to produce the sound.



To specify a channel we don't use 1, 2 and 3 as you might expect but rather 1, 2 and 4. (The Guide refers to the channels as A, B and C which avoids the numbering problem.) This is because this parameter is bit significant which means the computer looks at the value as a binary number and the instructions it processes depend upon whether the bits in the number are set (on) or not (off). The overall decimal value has little meaning. A brief look at the binary system should make this easier to understand.

The binary system

We (humans) use a number system with a set of ten characters (0 to 9). As computers can only differentiate between two states, 'off' and 'on', their counting system is based on two characters (0 and 1). This is known as the binary system. The word 'bit' is derived from BInary digiT and a bit is either a 0 or a 1. Eight bits, therefore, can be used to represent a number eight digits long, each digit being a 1 or a 0. Eight bits grouped together in this way are known as a byte.

The Amstrad is an eight-bit computer which means each of its memory locations can store a number up to eight bits long. With all bits set this would be written as 11111111 and with all bits off it would be 00000000. The latter is obviously zero and 11111111 in binary is 255 in decimal. If you find that confusing, we'll look now at how the binary system works.

In our decimal system, as we move from right to left, each digit is worth 10 times the previous one. For example:

26425 = 5x1 + 2x10 + 4x100 + 6x1000 + 2x10000

In the binary system, as we move from right to left each digit is worth 2 times the previous one. Read this from right to left:

10110110 = 0x1 + 1x2 + 1x4 + 0x8 + 1x16 + 1x32 + 0x64 + 1x128

We label the decimal columns as tens, hundreds, thousands, etc., and we arrive at the column values by raising the base value to successive powers of 2:

10^4 10^3 10^2 10^1 10^0 10000 1000 100 10 1
2 6 4 2 5

In binary we just double the previous column:

2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0
128 64 32 16 8 4 2 1
1 0 1 1 0 1 1 0

You should now be able to work out the decimal equivalent of a binary number. For example, 1111111 is 1x128 + 1x64 + 1x32 + 1x16 + 1x8 + 1x4 + 1x2 + 1x1 which equals 255. You may have discovered that you can't POKE a memory location with a value greater than 255 as 255 (11111111 in binary) is the largest number a byte can hold.

The bits in a byte are numbered 0 to 7 counting from right to left. The rightmost bit is also called the Least Significant Bit (LSB) and the leftmost bit, number seven, is called the Most Significant Bit (MSB).

As the binary system is at the root of all computer operations it is worthwhile becoming familiar with its use and Appendix II in the User Guide delves further into this side of computing. As Amstrad BASIC is generally quite friendly, however, you will only rarely need to get down to programming at bit level. Some sound-associated commands, however, such as SQ, use bit significant values.

Returning to the Channel Status parameter, the meaning of the overall value depends upon the bit settings. These are shown in Figure 3.2. To send a sound to channels A and C, therefore, we would set bits 0 and 2 which is 00000101 in binary and 5 in decimal. You can use Figure 3.2 to help determine the correct decimal values until you become more familiar with the system. Alternatively, you can specify the numbers in binary by prefixing them with &X. To send middle C to channels A and C you could write:

SOUND &X101,478

Rendezvous

The rendezvous facility permits notes on different channels to synchronise or sound at exactly the same time. For example, to synchronise channels A and B a rendezvous must be set on A telling it to rendezvous with B and a rendezvous must be set on B telling it to rendezvous with A. If no rendezvous is set, notes on each channel will sound as soon as they reach the front of their respective queues. Look at the next program.

100 REM PROGRAM 3.1 110 REM Rendezvous Demo

[From 100 to 440]

If BASIC is processing data then a small delay will be introduced between sound commands. Line 150 introduces a delay for us and illustrates how channels can be thrown out of sync. The second example uses rendezvous to keep the channels together. Each channel has been correctly synced with the others but this results in different channel status values for each channel which could be confusing to program. Fortunately, if we want to sync all three channels we can issue a blanket rendezvous command, 56 or &X111000, which means sync all three channels together. Thus A will also be told to rendezvous with itself as will B and C. Obviously, a channel _-_must_- sound at the same time as itself and this has no detrimental effect and is easier to program.

If more than one channel is specified in C then rendezvous is automatically implemented, eg if C was set to 3.

When issuing a string of sound commands we don't usually want every note to synchronise as one channel will

probably be playing several notes in the same time as another channel plays one or two. In any event, it's not always necessary to rendezvous all the notes. If the first notes are rendezvoused then the following notes should play in time as long as BASIC is not interrupted for too long. We'll look at this more closely in Chapter 9.

Hold and the RELEASE command

A hold is set with the sixth bit. It does just as it implies and holds the sound in the queue halting the playing of any commands. The hold can be released by flushing the channel(s) or by issuing a RELEASE command.

Hold can be used to start all the channels playing together as an alternative to an initial rendezvous setting. The RELEASE command is bit significant: 1 for channel A, 2 for channel B, 4 for channel C and 7 for all three. The release of a channel not held has no effect.

In practical terms, to set all channels playing together, a hold would be issued for all channels by:

SOUND 71,0,1,0

and three sound commands would be issued for each channel. RELEASE 7 would free all channels at once so they would all start playing at the same time. Control would then pass to the main program which would keep the sound channels filled.

Flush

If bit 7 is set to 1, when the SOUND statement in which it occurs is executed it flushes the sound buffer of any notes waiting in the queue and stops execution of whatever note may be sounding at that time. The SOUND command then executes its note. This can be thought of as jumping the queue and has several useful applications.

In a game which plays a background tune or which creates sound effects as objects move, at any point in the program the music can be interrupted and a different tune played. It does not have to wait until its present meanderings are completed. Explosions can be made to occur exactly at the time an object is hit.

In a musical context, for example, when priming the sound channels with a hold command as above you could also include a flush command in case any unplayed sounds are in the buffer:

SOUND 199,0,1,0

The rather intricate nature of just the first parameter of the SOUND command demonstrates the versatility of the Amstrad's sound production system. The other parameters are generally less complicated.

P: Pitch

This must take a value in the range 0 to 4095 and there is no default. It determines the pitch or frequency of the sound. Figure 2.4 and Appendix 1 list the pitch numbers required to produce notes in the conventional western scale. You will realise, of course, that the range of values allows us to produce pitches outside the western scale. We'll see exactly how to calculate pitch numbers in the next chapter.

In Chapter 6 Page 7 the User Guide says if P is set to 0 then no frequency is set. In fact, it produces a slight click. Try this:

10 FOR pitch=10 TO 0 STEP -1 20 SOUND 1,pitch 30 NEXT pitch

It is suggested that a value of 0 is used when only noise is required and in this case the noise is likely to cover up the click.

D: Duration

This takes a value in the range -32768 to 32767. If omitted it defaults to 20. If greater than 0 it sets the length of time the note is to sound in 1/100ths of a second. If equal to 0, the duration is governed by the length of the volume envelope specified. If no volume envelope is specified, ie if a command is issued such as:

SOUND 1,478,0

then D equals 200, effectively tapping the duration of the default ENV. When D is less than 0, the positive or absolute (ABS) value of the number stipulates the number of times the volume envelope will repeat. For example, these two sounds have the same duration:

SOUND 1,478,400 SOUND 1,478,-2

The repeating envelope is the default ENV with a built-in duration of 200. This provides us with yet more control over the sound generator and can be put to good use in special effects, especially when more complicated ENVs are used.

V: Volume

This takes a value in the range 0 to 15. If no ENV is specified then the value range effectively runs from 0 to 7; 8 to 15 being a duplication of 0 to 7, eg 8 is equal to 0, 9 is equal to 1, etc. If an ENV is specified then the volume can be set to any one of the 16 values. 0 is off. V defaults to 4 when no ENV is specified. The Guide states that it also defaults to 12 if an ENV is specified but if an ENV is specified then V must be given a value as ENV is set after V in the parameter string. What it probably intended to say was a volume of 4 withno ENV is the same as a volume of 12 with an ENV. V is the initial volume and can be altered by an ENV.

You can test these values by running this:

10 FOR vol=0 to 15 20 SOUND 1,478,50,vol 30 NEXT vol

and then this:

5 ENV 1,1,15,1 10 FOR vol=0 to 15 20 SOUND 1,478,50,vol,1 30 NEXT vol

You will see that using an ENV gives us twice the number of volume levels although the maximum volume is the same.

VE: Volume Envelope

This takes a value in the range 0 to 15. 0 is the default value. VE specifies the number of the volume envelope (ENV) which will control the volume of the sound. The ENV must previously have been defined. If an ENV is specified which has not been defined then the default of 0 is used. ENV 0 can not be redefined by the user and plays the note at the volume set by the V parameter.

The volume of a sound is affected by many factors as we saw in Chapter 1. If the amplitude of a waveform is doubled, however, the sound does not appear to be twice as loud. This is because we perceive sound in a logarithmic fashion. If vibrato or tremolo is applied to a note it will seem louder, and volume varies with pitch, too, so that low notes need more power to sound as loud as higher notes.

TE: Tone Envelope

This takes a value from 0 to 15. 0 is the default value. TE specifies the number of the tone envelope (ENT) which controls the pitch of the sound. The ENT must previously have been defined. If an ENT is specified which has not been defined then the default of 0 is used. ENT 0 can not be redefined by the user. It is set to play an unmodulated pitch as specified by P in the SOUND command, in other words, it has no effect.

N: Noise

This takes a value of from 0 to 31. In Chapter 6 Page 8 the User Guide erroneously states the range as being from

0 to 15. The default is 0 which is no noise at all.

You can hear the range of sounds available from this parameter by running this:

10 FOR n=1 to 31 20 SOUND 1,0,200,7,0,0,n 30 NEXT n

It can be used to produce all manner of sounds from explosions to rhythm patterns.

The sound generation hardware has only one noise setting. If different values of N are set on more than one channel then each new value of N overrides the previous one. All channels with an active N parameter will produce noise at the same frequency.

Noise deserves a section to itself and we look at it more closely in a later part of the series

Putting them all together

All SOUND parameters are expected in integers. If they are not given, they are rounded in a similar way to the ROUND function, ie

SOUND 1,16.4999

produces the same note as:

SOUND 1,16

and

SOUND 1,16.5

is the same as

SOUND 1,17

SQ(c): the state of the sound queue

After issuing a number of, often complex, sound commands it can be difficult to ascertain exactly what each channel is doing at a particular time. The SQ function allows us to interrogate a channel to find out how many free entries are in the queue, whether the channel is active (playing) and if not, why the entry at the head of the queue is waiting.

The c parameter in the SQ(c) function is bit significant: 1 specifies channel A, 2 is channel B and 4 is channel C. Other values will not be accepted. It returns an integer which, again, is bit significant. To extract the information we must look at the value as a binary number. We can do this by using BIN$ which prints a string of binary digits representing the form of a number (see Chapter 8 Page 4 of the User Guide), eg:

PRINT BIN$(SQ(1))

The bits have the following significance:

Bit 0 to 2: number of free spaces in the queue (0 to 4) Bit 3 : rendezvous with channel A Bit 4 : rendezvous with channel B Bit 5 : rendezvous with channel C Bit 6 : hold is set Bit 7 : channel currently playing

The SQ interrogation only takes place on the sound at the head of the queue. Interestingly enough, if you try to rendezvous a channel with itself, eg SOUND 9 or SOUND 56 for channel A then this rendezvous doesn't show. If a hold and a rendezvous are both present, then only the hold bit, bit 6, will show as set. The rendezvous bits and bit 6 and bit 7 are mutually exclusive.

When an SQ function is issued it disables any ON SQ GOSUB interrupt set for that channel. We look this now.

ON SQ(c) GOSUB: filling the queues

Amstrad BASIC helpfully provides the programmer with a system of interrupts. These are explained in the User Guide Chapter 10 Page 1. They enable us to perform a number of operations simultaneously, a facility often referred to as multitasking. You may already be familiar with the AFTER and EVERY commands which activate normal programming interrupts. The ON SQ GOSUB is an interrupt designed specially for sound production.

The c parameter in ON SQ(c) GOSUB is bit significant as usual and takes a value of 1, 2 or 4. When the command is issued it will automatically GOSUB to the specified line number if there is a space in the sound queue of that particular channel. It ensures that the channel is kept supplied with notes.

There are four interrupt timers - 0 to 3 - with different interrupt priorities. 3 has the highest priority and 0 the lowest. The sound queues have independent interrupts all of equal priority which is the same as timer 2. Once a sound interrupt routine has started, therefore, it will not be interrupted by other sound routines.

The action of interrupting disables the event and to rearm the interrupt the ON SQ GOSUB call must be issued again from within the subroutine. As mentioned above using the SQ function will disable the interrupt as will issuing a SOUND command for that channel.

Interrupts, and the SQ interrupts in particular, are powerful programming aids. Once set in motion they automatically take care of the sound production housekeeping so BASIC can process other instructions at the same time. They simplify multi-channel programming and we will be making use of them in later in the book.

Stereo sound and external speakers

You can give an added boost to your sound and music programs by using the stereo capabilities of the Amstrad. To do this, you must connect the I/O port at the back of the computer to a hi-fi system or pair of stereo headphones. Channel A plays from one side, channel C plays from the other and channel B plays from both and will appear to come from the centre.

To plug into the I/O socket you need a mini stereo jack plug. Headphones which are intended for use with personal walkman cassette players often have this type of plug. Alternatively, you can buy a variety of adapters which will allow you to plug into most music systems, eg a mini stereo jack plug on one end and a normal stereo jack socket on the other. These are usually available from electronic component suppliers.

Playing the output through external speakers has two advantages: stereo sound and an increase in sound quality. The Amstrad's internal speaker is really too small to do justice to the sound output and if the volume is turned up too high or if all channels are playing low or loud notes then it will rattle and the sound will distort. Even if you can not route the sound through a stereo system, at least try to listen to it through an external speaker so you can compare the quality.

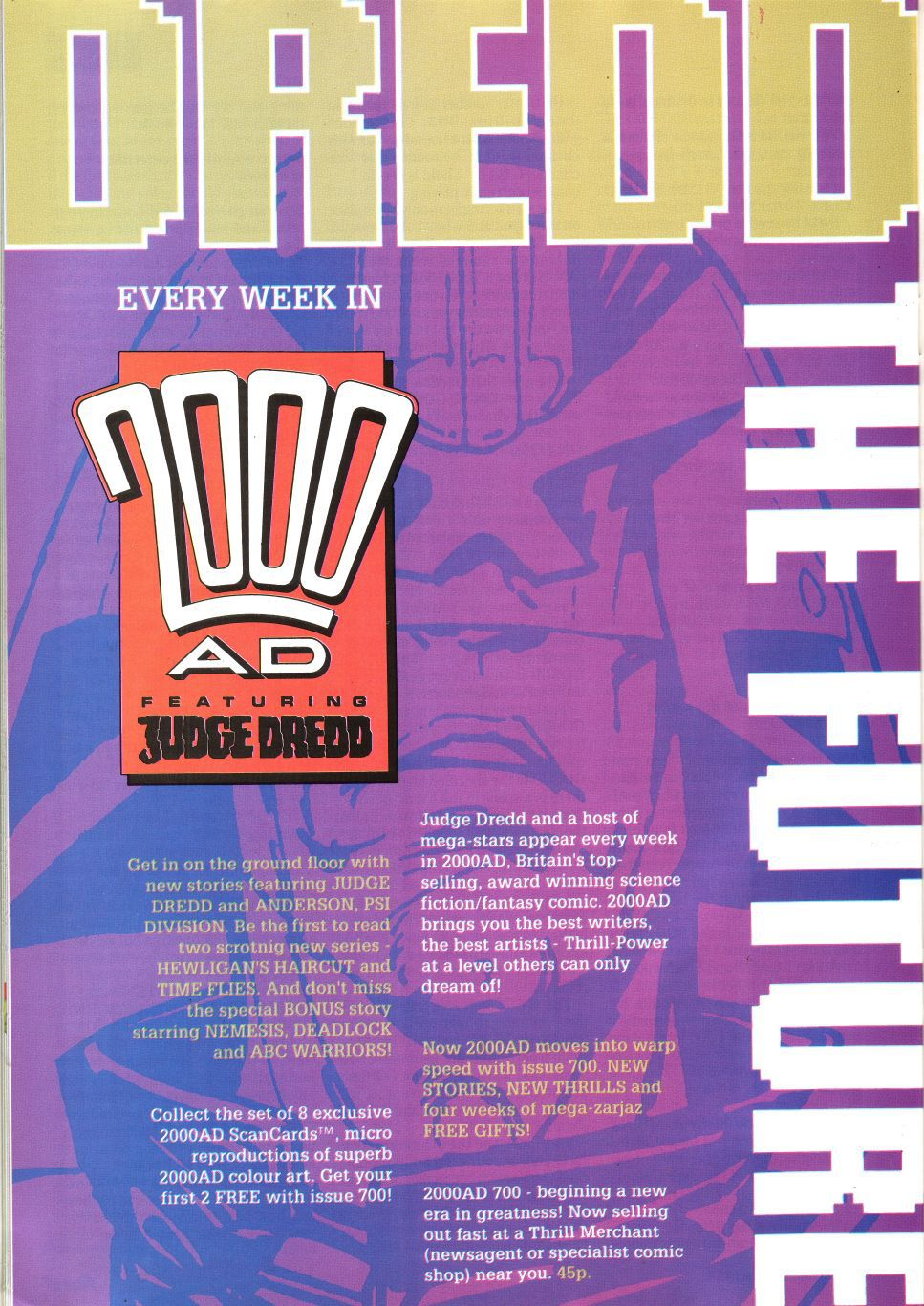
Panning

Panning is the act of moving and positioning a sound within the stereo field. A very impressive effect is to pan a note from one speaker to the other. We can pan notes on the Amstrad but we need two channels to do it. Here's a simple demonstration.

10 ENV 1,1,15,1,10 20 ENV 2,1,15,-1,10 30 SOUND 1,956,0,0,1 40 SOUND 4,956,0,15,2

Alter the last parameter, the pause time, in the envelope commands Experiment with the volume levels and envelopes themselves, too, and see what stereo effects you can produce. Panning could be useful for sending a bomb or missile whizzing from one side of the screen to the other.

That wraps this lot up nicely - next month, we'll look at scales and pitches, and how best to calculate the values that prevent your Arnold being tone deaf!


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PD Scene

Hello again, this time in the PD column, there's two new PD libraries crying out for a mention, DPD and Data PD.



DPD Public Domain

DP is a fairly new library, it was launched this August, but has been in the planning stage for over a year. David Carter, the proprietor, has clubbed together 10 disks so far, each of them covering a different type of software.

The first disk I booted (and I mean that in the loading sense) was the animation demos. These have been produed by David himself using Discovery's Animator, and the result is super smooth wire-frame animation. Unfortunately, m ost of them will only work on a 6128 as they can use up to 70K.

There are seven of these demo's in total, but only three are mentioned here. The first one, and my favourite, is Peggy. This is a small cartoon that shows a penguin (at least I'm told it is a penguin, looks more likea budgie to me!) first ducking a missle and then being squashed by a 10 ton weight. Gruesome stuff!

The second is called SCPD 120 frame Promo, but don't let the nae put you off! This was actually produced for Scull PD Library (remember them from last month?) and features the letters SCPD whizzing around the screen doing spectacular things. Only one thing bothers me about this, why those four letters? Surely it would be more sensible to use the word SCULL, or SPD? Still that's beside the point.

The last demo I thought worthy of a mention was Bubbles. David claims that this 'is unique in that it's 3D, something that the Animator isn't meant to do!'. So, curiosity got the better of me, and I loaded it. My first impression was 'cor, look at that', but then I remembered it was supposed to be in 3D! To be fair, some parts did give the impression of another dimension' but I didn't think that the whole ensemble (yes I've been watching those adverts too) merited the build up. Despite this, the demo is a good one, but the 3D you'll have to judge for yourself.

Finished with the animation disk, I then moved onto the Artwork disk. It was then I realised that this would be very difficult to review due to the large amount of windows, brushes, and patterns specifically for the Advanced Art Studio (which I don't have!). Still, there were a few standard pictures, and those very good.

Well, that about raps up DPD's mention, but if you want to receive details of David's little operation then there are two ways you can do it. Firstly, if you send him an SAE then he will send you his order form, this also has a very concise stock list on the reverse side (it's only one page). Alternatively, you can send 50p and a disk (or £3.50 if you don't have a spare one), and David will return you his catalogue disk. This contains a more detailed and up-to-date version of the catalogue as well as several small files taken from the library.

DATA PD

The second of our new PD libraries, run by Tony Kingsmill, offers software on both cassette and disk.

Unlike most other PD libraries, Data has a unique Pick 'n' Mix facility which means you only order what you actually want. This is a big plus for the library since you don't have to order a full disk of files just to get that single Disk Menu program you have always saught after.

On the minus side though, the library is a bit expensive; 2p per K is charged for copying. At first, this does look cheap, but work out how much a 356K disk full would cost (OK, I'll do it for you), a staggering £7.12!

The library contains a fair amount of PD, some good, some bad, but that's to be expected. On the cassette (I don't think he trusts me with a £2 disk!) I was sent to review was a program called Top of the League. This, as you can see, looks pretty good, and is just an example of the goodies in Data PD's banks.

OK, that's it for this month. Don't forget, if you want a mention in the PD scene, send in some examples of your waves to ACU and we'll see it gets published. Til next time, have fun and happy hunting.

Paul Tint



To Boldly Go...

Auntie John's several year mission grinds to a halt as he goes where no sensible person has gone before: Beyond the firmware



Where did we finish last month? Oh yes, I remember: slowly. We were bouncing a ball around the screen and everything was happening real slow. And what conclusion did we come to? Is rhetoric overrated? Is the new series on Star Trek any good?

Ahem. Sorry about that. Programming in machine code always gets me excited. Back to the real world. The way to speed up our graphics is to stop using the firmware. The firmware, as you should recall, is the set of routines built-in to the CPC to handle everything from the keyboard to the sound chip.

You might wonder why the firmware is a bit slow. You might think that the programmers who wrote it werea bit sloppy and didn't really want to go very fast. You'd be wrong.

The firmware routines were written to be flexible. They were also written to be reliable. So, for example, the routine to display a letter on the screen works in any screen mode. All the time. Reliably. This sort of coding takes time to execute, but I'm sure you would rather use a computer which worked all the time, rather than one which worked a bit faster but crashed a lot. Wouldn't you? What? You have seen an Atari ST?

The last program we wrote bounced a ball around the screen. However, since it used the firmware to draw the ball, it went slowly. So lets dump that part of the firmware.

To write things to the screen, you need to understand what is actually happening. It's actually quite simple, because what you see on the screen is nothing more than a big block of memory. Sixteen kilobytes (16K) to be exact.

When the screen is empty (just after a CLS for example), all the memory has been reset to hold zeros. Nothing in the screen memory means nothing on the screen. Simple.

When you change the contents of the screen memory, you suddenly start to see things on the screen. Here, try this BASIC program:

```
10 MODE 1
20 POKE &C000,1
30 GOTO 30
```

The last line is just to keep it busy while you examine the screen.

Pressing ESC twice will sort it out.

See the tiny pixel on the top left? That's a piece of the screen memory which you changed by POKEing it. The screen memory starts at (hex) address &C000.

Just how the value you place in memory effects what pattern of pixels is displayed on the screen is a complicated topic. It depends on the screen mode used and what colours your pens and paper are set to. The best way to find out is to experiment with the listing above, trying different numbers from 1. Keep notes, and you'll soon suss it out. Start with MODE 2, as this has only two colours and is simplest to understand.

If you remember your binary arithmetic, you'll have a head start. If you start playing with either MODE 1 or MODE 0 remember to set your logical pens to some obvious colours. The

the pen number, not the colour!

OK, so we can put a small line directly on to the screen with a POKE &C000,255. To put a line next to it, we can POKE &C001,255. In fact to draw a line across the entire screen we can keep adding one to the memory address. It's only until we get to the edge that the problems start.

You might hope that once at the far right of the screen, adding a further one will bring the line back on to the far left. It doesn't. What normally happens is that the little line goes into hyperspace for a bit, then reappears somewhwere else further down the screen..

Of course, there is a logical pattern to how the addresses refer to different parts of the screen. And of course it would take an entire article to explain.

So (as usual) we'll cheat.

Although I promised not to use the firmware to write things to the screen, I didn't say I wouldn't use the firmware to calculate the screen addresses. Sneaky, eh?

Just for us, those nice CPC designers gave us PREV_LINE and NEXT_LINE to calculate the screen address immediately above and below the current address. Yes, really! You just load hl with the address you know, call the relevant routien and Hey Tesco! hl now has the new screen address in it. As you can imagine, this is quite useful.

The example listing this month will draw a line all away across the screen. Then it waits for a bit, erases it and moves it down. This happens all the way down the screen. Then it starts moving up again. It looks very nice, take my word for it.

It also gives you lots of scope for experimenting. Try changing the value loaded into the A register. This is the avlue we POKE on to the screen, which explains why zero is used to erase it. The value of fifteen is used because in MODE 1 it draws a solid bar. When MODE 2 is used, you will end up with something completely different.

Finally, try this for a surprise. Instead of LD A, O put LD A,R in instead. I guarantee some interesting results!

Right, now I'm off for a rest. All this machine code has been playing on my mind and I need a break. If you care to remember, I have been Z80 coding now for years and years...

If you really want more programming, the best thing to do is write to the Editor and tell him exactly what.

In the meantime: Well it's been fun. See you around!

LISTING

```
org &8000

set_mode equ &8c0e
next_line equ &bc26
prev_line equ &bc29
frame equu &bd19

            ld a,1
            call set_mode           ; Try a different mode!

            ld b,199                ; All the way down the screen...
loop1:      push bc
            call draw_thing
            call frame
            call erase_thing
            call move_down
            pop bc
            djnz loop1

            ld b,199                ;and all the way up...
loop2:      push bc
            call draw_thing
            call frame
            call erase_thing
            call move_up
            pop bc
            djnz loop2

            ret

move_down
            ld hl, (thing_address)
            call next_line
            ld (thing_address),hl
            ret

move_up
            ld hl, (thing_address)
            call prev_line
            ld (thing_address), hl
            ret

draw_thing
            ld hl, (thing_address)
            ld a,15                 ;Change this number!
            ld b,80                 ; All away across the screen...
loop3:      ld (hl),a               ;POKE it into the screen,
            inc hl                  ;and move it across.
            djnz loop3
ret

erase_thing
            ld hl, (thing_address)
            ld a,0                  ; Change this number!
            ld b,80
loop4:      ld (hl),a
            inch hl
            djnz loop4

ret

thing_address dw &c000              ;A variable to store our screen
                                    ; address. Takes two bytes.
```

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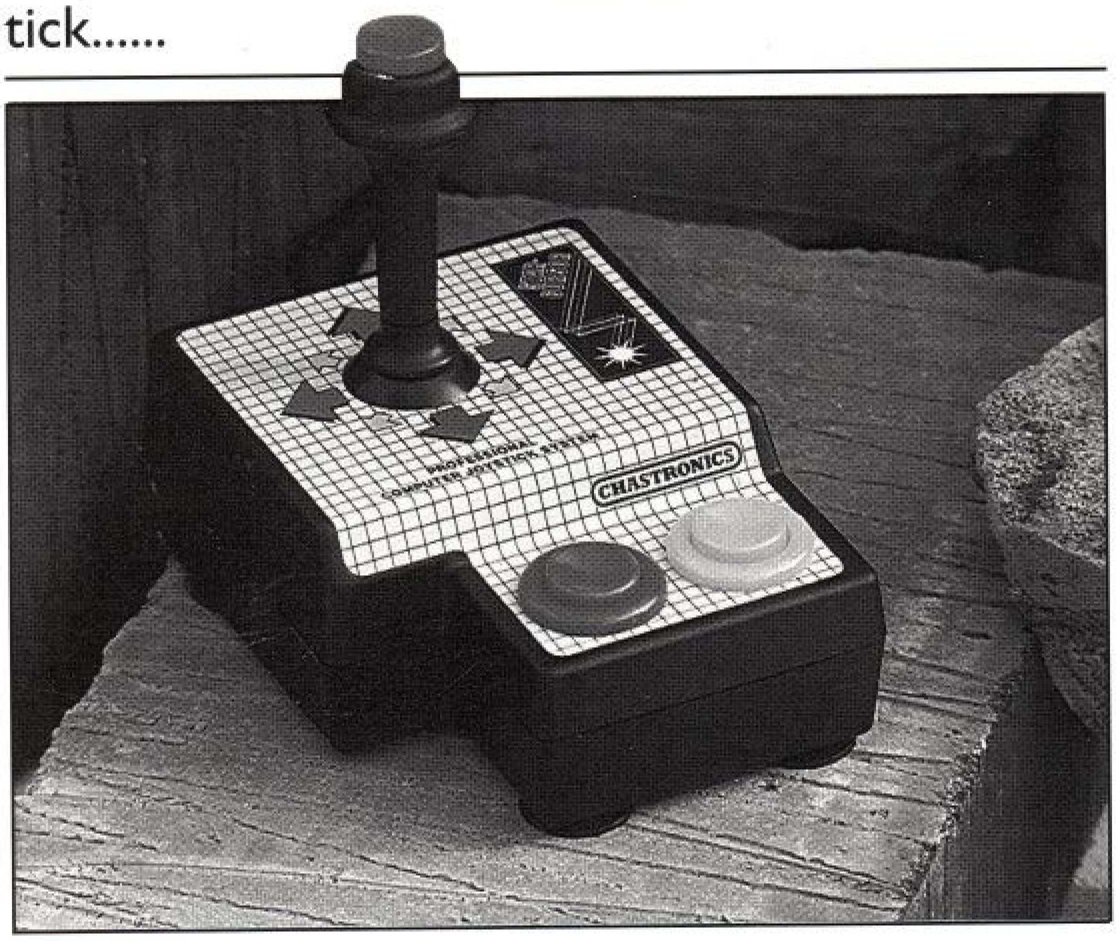
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Cursing the stars

Wandering around the Soho arcades, ACU came across a bedraggled, slovenly American, babbling inanely about a joystick that will last forever. So we, er, hired him. ACU exclusively presents ELMER K. GARDENER III and the amazing (or not) STARCURSOR joystick......



When I came across ACU correspondent Gus Ivyleague in the arcade, I introduced myself with The Coin-Op Joke, hoping he hadn't heard it before: "What do you get if you meet a missionary in a laundromat? A coin-op conversion." What a thigh-slapper! And with the humour out of the way in that new, automatic, best-selling, as seen on cable TV, bite-sized lump, it's down to business....

Do you ever wonder what the attraction of the arcade really is? Is it the atmosphere of intense concentration as we all try desperately (speak for yourself – Ed) to get through one more level? Or is it the mind expanding virtual reality of the shoot 'em up, kick 'em about, ninja nutting 3-D vector graphics in those LOUD colours? Well, for some the attaction lies simply in the ability to kick the hell out of the chunky controls – until the bouncers do the same to you.

Now we coin-op fans can allegedly bring a little of the arcade into our own chicken shacks, with starcursor, an Australian joystick shipped to you limeys by Solid Gold Marketing, a Scottish importer.

At first sight, Starcursor looks as ergonomic as a builder's breeze block, but what it lacks in style it makes up for in durability (it says here). Incredibly, the stick carries a THREE YEAR guarantee and maker Multicoin Amusements claim it has been tested to 50 million operations without failing. Doin' my sums, 50 million operations over three years allows you more than 45,000 waggles a day, but the company does not distinguish stick operations from fire-button presses, so it is not exactly clear what 50 million operations refers to. Either way, you're covered: "If the joystick fails at all in the first three years just send it back to us and we will replace it with a brand new one." says the Solid Gold man. Why so confident? The stick is actually designed for an arcade machine and has been cut down for the home user, but importantly the parts that make it a durable coin-option have been retained. There are very few moving parts and those that do move are built using hard wearing materials – with no springs attached.

As the picture shows, the Starcursor is cumbersome, but it is not designed to be a handheld. This is definitely a stick-down job, which it does rather well on a smooth table top. There are three fire buttons – one on the stick and two on the base unit. A three-way switch on the rear allows users to select between all three buttons active, single stick fire or just the two base buttons active. There is no locking switch for autofire mode.

A swivel switch on the underside of the Starcursor allows users to switch from eight way action to four way, for those games requiring more accurate right angle movement. Unlike most joysticks, this one does not have a switch making it compatible with the Amstrad CPC, but it works nonetheless. Interloping Spectrum users may be interested to know you'll require a special adaptor to get the Starcursor running on your micro.

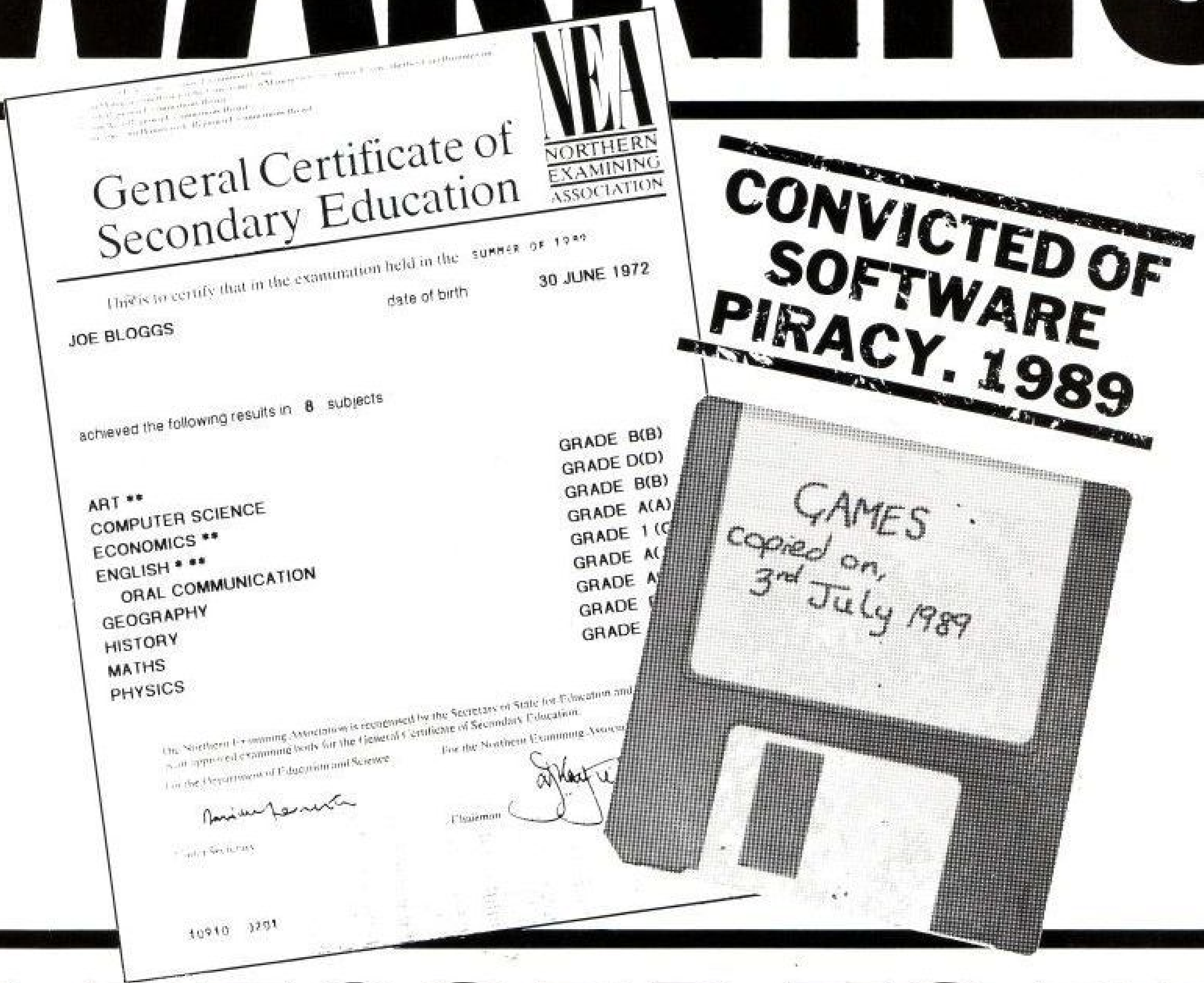
Starcursor, at £29.95, is expensive, but if its maker's claims hold out it is a good investment – how can you lose with a three year guarantee? It has a good, easy action and positive fire button response. It's major drawback is that it cannot be picked up easily and used as a handheld – there are points in some games where that is required.

If nigh on £30 is too much for you, try the Spectravideo 125 Superboard stick (at £19.95) – but remember that this, like most other sticks, only has a one year guarantee.

Fax Box

Product: Starcursor Joystick
Price: £29.95 (£2 P&P)
Supplier: Solid Gold Marketing
Address: Unit 6, Lomond Trading Centre,
Lomond Ind. Est., Alexandria, Dumbartonshire,
Scotland G83 0TL.
Tel: 0389 55973

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Worlds 4 and 5
The heat is on and Morgul awaits as Mr T approaches the final showdown against evil.
TURRICAN
I sense evil all around me...
Suddenly..from the shadows..
...and above.. Aaargh!
Morgul's minions close in on their prey
I..I.. c..cannot give up n..now!
Time to die little man!
What in God's name is that?!
Not so fast, you ugly spore of hell!
Doom provokes action..
Colin Jones '90


I'm coming in Morgul and you'd better be ready for me.
The road to Morgul
Gotta blast through this maze!
Morgul..the face of death!
Nnngh!
Pretty good at deliverying pain aren'tcha!
Now take some of it back! Yaaah!
Victory..but wait!
This place is gonna blow! I've gotta get out!
Way to go!!
The tower explodes, Morgul is defeated and the world is one better place without him. Thanks to Mr T!
THE END

Doc'll mend it!

This month, the Doc gives some advice on seeking publishers, and goes back into his Mini Office, as well as doing some Crystal Ball gazing.



Greetings, fellow CPC enthusiasts! I trust you are all well, fully fit, and raring to go. As I write this, we are fast approaching the busiest time of the year for computer sales, and this year promises to see large numbers of CPCs being sold. The new Plus range will doubtless swell the ranks of Arnoldophiles by a considerable number, so I'm clearing the decks for an influx of new users' problems come the new year.

I have to say they'll be welcomed with open arms, but, just to show I've no bias, the first out the postbag this month comes from an old friend (in the nicest possible sense of the words) John R. Hudson. I quote:

'You are very fair in your response to T. R. Wheeler's comments about MOII (ACU August 1990). However, in relation to the bar commands, they only work as far as I'm aware when a menu is showing and the punctuation required with basic is omitted, ie. |ERA TEXT.DOC, not |ERA,"TEXT.DOC".

I think you had a letter from my brother pointing out that the 16 character limit for bar commands with earlier versions has been removed with the later versions. Perhaps Mr. Wheeler is unaware of this limitation.

When using a database Mr. Wheeler {B}should{N} enter account numbers as text, or alphanumerics, as MOII correctly calls them. That is good database practice since they will then not be at risk of having maths applied to them and changing mysteriously!

And yes, he cannot enter printer control codes in the database module. But both the Wordprocessor and the label printer can import data from databases, so all he needs to do is create some templates, preferably in the wordprocessor module, as that can store the printer control codes in the template. With the label printer, the

printer control codes have to be loaded every time the module is used.

In relation to Danny Munroe's comments about DR. Graph, two points may be helpful. The physical ratio of the X-axis to the Y-axis changes between screen, full page printout and multi-graph printout to give a best fit. The position of the legends is defined by a point on the virtual screen used by GSX and their size in Fonts 2, 3 and 4 by the Y-axis. So, as the physical ratio of the X-axis to the Y-axis varies, what looks right onscreen may look awful on a multi-graph printout.

However, the examples in the magazine appear to use the Machine Font (Font 1); in general, Font 1 should be avoided, particularly for multi-graphs, as it is not normally scalable. So, legends will not be adapted to the different physical dimensions of the different display modes. I realise that some of the scalable fonts are unreadable in size 1 on the screen, but they print out perfectly well on paper.'

As usual, John, I'm indebted to you for your sage words. As you know, I was unable to get hold of a (legitimate) copy of DR Graph, and DR themselves have been, er, less than helpful with any queries I've tried to pass on. It's only through people like yourself that I've got any chance at all of being able to handle the problems that applications of this nature tend to throw up.

One thing puzzles me a little, though. I wasn't aware, until now, that there is some scalable font architecture built into DR Graph, and it seems to me that this is a facility that isn't used nearly enough in other applications.

I am, of course, aware that Peter Brunning has incorporated scalable fonts in his top end WP applications, and that Stop Press also has a pseudo scalable font architecture - but in the latter case, as the font grows, so does the exaggeration of the stepping on curves, as I recall. Peter's output is very good, and even more so if you have access to photocopiers that will scale down A3 to A4 and so forth - so I'd like to see more software producers taking a similar approach.

Your point about aspect ratios of screen vs printout has long been a bone of contention for computer users. The actual causative factors can vary, but are usually based in the difference between the shapes of pixels being often vastly different from the shapes of print head needles - hence ellipsoid circles and rectangular squares on hard copy emanating from perfectly formed figures onscreen. The extension of this includes the reproduction of alphanumeric characters as well, of course, which tends to make for what I call WYSIAWYG (pronounced WHY-SIGH-A-WIG) - What You See Is ALMOST What You Get! It can be galling to spend ages concocting a masterpiece onscreen, only to have it look as though it's been through a mangle when the hardcopy is finally produced.

Once again, John, thanks for your timely support - long may this relationship continue!

Breaking in...

Angela Swinbourne, from Redditch (where some excellent fishing tackle is made, and the home of Partridge - hint) has sent me a plea from the heart. Some time ago, we discussed methods of copyrighting software and having it distributed. Angela took the advice we cobbled together, and has produced a couple of games - I'll let her take up the story:

'I have written the two enclosed games (Pacifist & Cloaker) on the 464 and I would appreciate it if you would look at them and give some advice, as I have already sent games to software houses, asking them to return the discs if they weren't interested, but they didn't have the courtesy to reply, even after letters and phone calls.

I have copyrighted them, as per advice in ACU, and the instructions are enclosed...'

I spent a while on the phone to Angela discussing this and that - her programs are, if not state of the art, quite playable and enjoyable. In fact cloaker incorporates some novel concepts in computer gaming - concepts that could never be applied to a board game, from whence it seems to take its inspiration. I'm not going to go into any great detail - this isn't a games review section, but one point I will make.

Angela has made good use of a BASIC compiler - Laser Basic, in fact, and has produced a couple of games that would do justice to the budget end of the market. She told me the names of the two software companies that she had dealt with thus far, and I have to say that I'm appalled at the offhanded way in which they've handled the dealings.

Despite repeated phone calls and promises, Angela has had neither rejection nor acceptance of her programs. This isn't in any way acceptable, but it is, as I understand it, par for the course. Company 'A' may not want it, but they don't want companies 'B','C' and 'D' to get it either, so they sit on it - you can't submit to more than one firm at a time.

My advice would be to see a solicitor and sue for the return of your property, Angela, and then concentrate your attentions on a few of the major players, who have reputations to keep. Also, by the time you read this, our illustrious (and inebriate) Editor (all hail, bow, grovel) ought to have been in touch with you as we discussed.

Crystal Balls

And so to the crystal ball gazing. You may remember donkeys ages ago, that we had a letter that mentioned that fabled beast the CPC Hard Disk - Romantic Robot seemed to have incorporated routines in Rodos to allow for one. Well, two days ago, as I write this, I took delivery of just such a thing. Yes, you read it right, a CPC Hard Disc!! You may have noticed adverts from Fritz Obermeir in the back of ACU advertising the units, and wondered why you never saw mention of them. Wonder no more - it's taken ages to sort it all out, but, after parting with the necessary shekels (or ERM stabilised Deutschmarks, to be more accurate) I've now got one to dissect.

I won't even attempt to give you an in-depth review at this stage - after two days of having it in the house, polishing it, admiring it, and having my wife answer all phone calls, I've still not managed to translate the manual from German into my version of English, and there's some work to be done to get it up and running. At the moment, Fritz (Fred to his friends - honest!) is in the process of getting the English manual to me. I shall resist temptation until it arrives, but you can look forward to a full scale review in the very near future - next month, in fact. I wouldn't be at all surprised if it was an exclusive, either, because I doubt if the bods at Alcoholics Anonymous are even aware that it exists yet.

So, all of you that are interested in having massive amounts of storage for your bits and bobs of data, watch this space!! I've waited since 1985 for this, and I suspect that many of you have too!

Exit stage left one smiling and ever so slightly smug looking Applications Advice columnist, whistling a merry tune, and waving a cheery farewell to his beloved readers.

Let There Be Light (and Gravity)

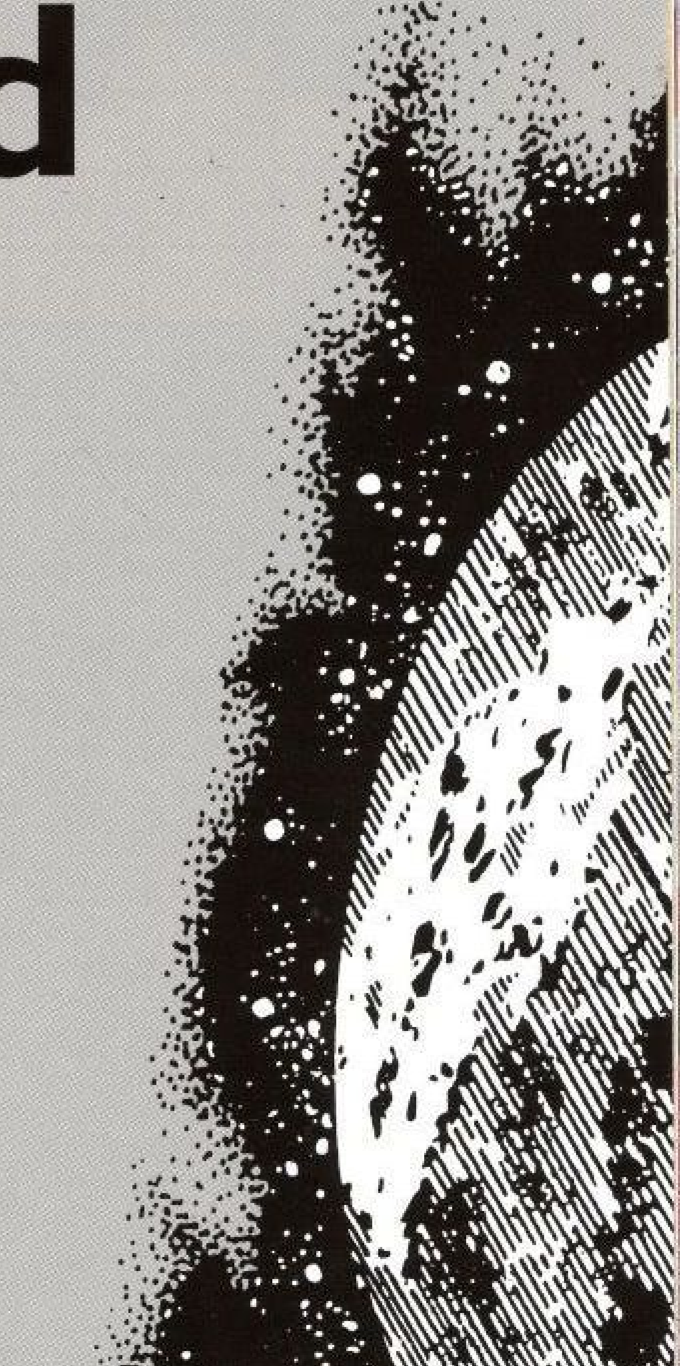
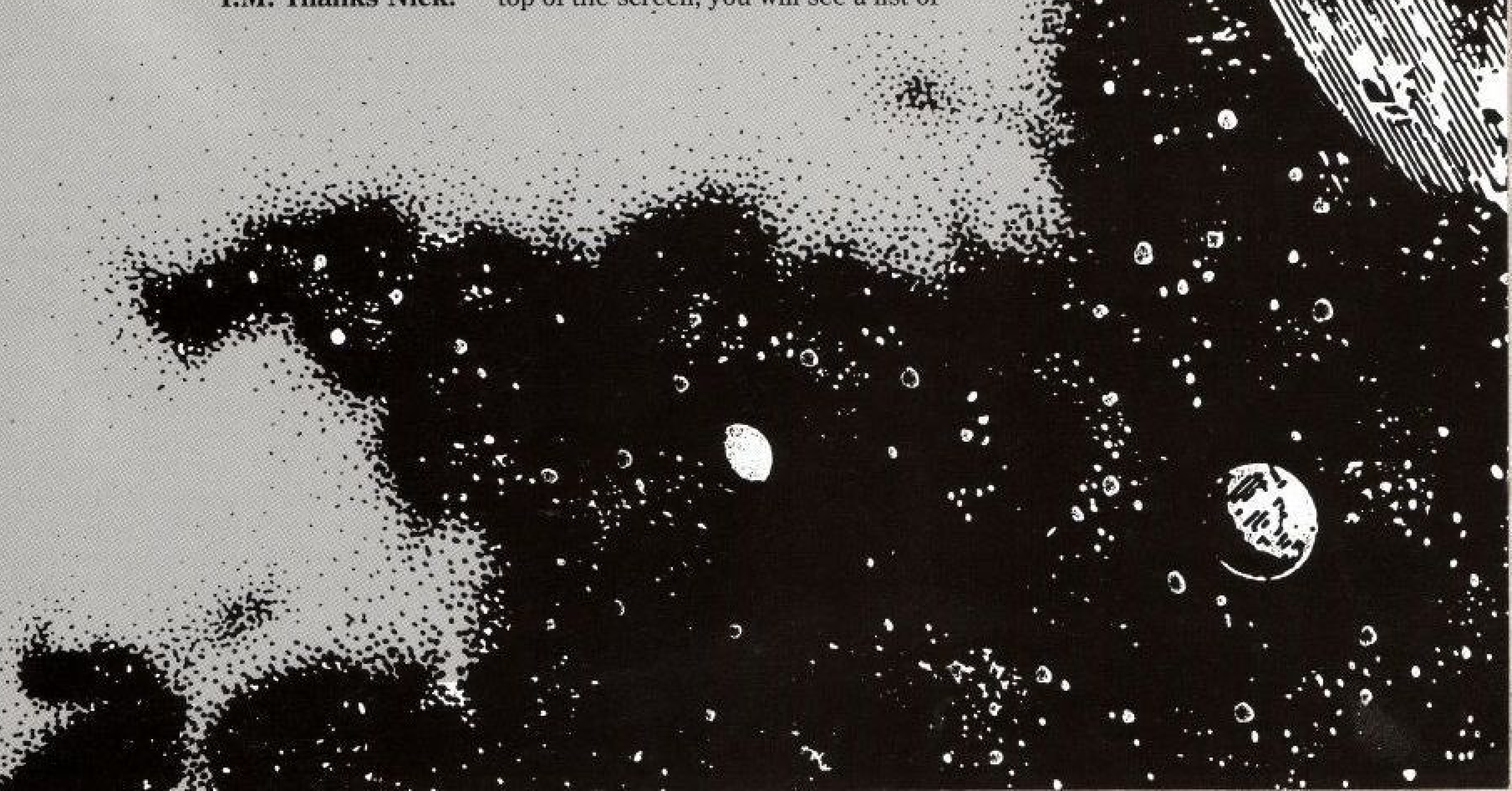
Nick Hutton takes a walk around the galaxy with some learned friends.

A few weeks ago, when we were still enjoying a good summer, I was sitting in my garden. As I leafed through last months esteemed organ (that's ACU folks), a large pomegranite fell from the tree I was sitting under and struck me on the head. "Eureka!" said I, as the product of all those dim and distant A Level Physics lessons came flooding back to me. Simultaneously I had the inspiration for this months listing.

The following program will allow you to analyse the behaviour of celestial bodies and the interaction thereof. It uses Newton's laws of force and motion to simulate a theoretical corner of the universe. For a full and complete breakdown of all its features I'll hand over to my learned friend Sir Isaac Newton (who usually plays only shoot-em-ups on his CPC). Take it away Isaac.

I.M. Thanks Nick.

Well as Nick said, with this listing you can sit back and watch as my laws of force and motion are put into practice. To get started then select option 1. The built in example, this illustrates the Earth Moon orbit. Or press 2. if you want to input your own data from one of the tables or just make some up. If you wish to draw a graph of the paths which will be plotted to screen then select option 3. The simulation will run but instead of the initial data being at the top of the screen, you will see a list of

DATA FOR BINARY STAR SYSTEM			DATA FOR ANTIGRAVITY	
MASS	100	50	100	100
VELOCITY	1.49	2.98	4	4
ACCELERATION	0	180	-45	135
X	320	320	50	200
Y	170	100	150	30
GRAVITY	10	0	-7	0

DATA FOR EARTH-MOON ORBIT			DATA FOR ANTIGRAVITY	
MASS	100	600	10000	1
VELOCITY	12.16	0	0	3
ACCELERATION	0	33	0	45
X	40	0	320	320
Y	240	40	170	100
GRAVITY	180	0	50	0

co-ordinates to plot. These co-ordinates are colour coded to correspond with the celestial bodies on the screen. It is then a simple matter to draw up a sensible scale on graph paper and then plot every ten or perhaps twenty values.

If you have an Epson compatible screen dump somewhere amongst your disk collection then press CTRL to get a seventeen K screen file onto disc, sorry not tape. It is then up to you to obtain your hard copy from the aforementioned screen file.

Newtonian Physics does take a few minutes to sink in so why not enter one of the printed examples elsewhere on this page. This should give you an idea of what sort of data is required. For a complete explanation of these examples I'll let my colleague Mr Johannes Kepler take the floor. (He was given his CPC6128 last year for his 419th birthday).

J.K. Ah Hellow readers, and thank you Isaac. I'd like to get back to my 6128 so I'll be as brief as possible. Now onto the examples:



1. Earth Moon Orbit

After entering the data you will be able to see the Moon travelling alongside the Earth. The Moon has the required mass and velocity to orbit without being pulled into the Earth, but is is not massive enough or fast enough to escape the Earth's gravitational field.

2. Binary Star system

This example will simulate the interaction of two binary stars like Delta Librae in the constellation of Libra. The stars have the required mass, velocity and gravity to orbit around a common centre of gravity.

3. Slingshot satellite manoevre

When we wish to observe a distant planet in detail we must use an exploration satellite. Voyager II was launched to observe many such planets, but to travel directly to each planet it would have needed a vast amount of fuel. To reach distant planets, scientists had to develop another method of propulsion. So the slingshot manoeuvre came into being. A satellite uses the gravitational field of a more massive planet to fling it off at great speed onto the next object which is to be studied. The data provided will give a reasonable simulation of this carefully calculated operation.

By the way this method of travel will be used by the Magellen solar probe, when it slingshots around Jupiter on it's way to the Sun.

4. Anti Gravity

What would happen when one planet drifted towards another planet and the force of gravity were reversed? Well, now you can find out. Observe as both celestial bodies drift towards one another, and then as the force of antigravity takes effect and they slowly glide apart.

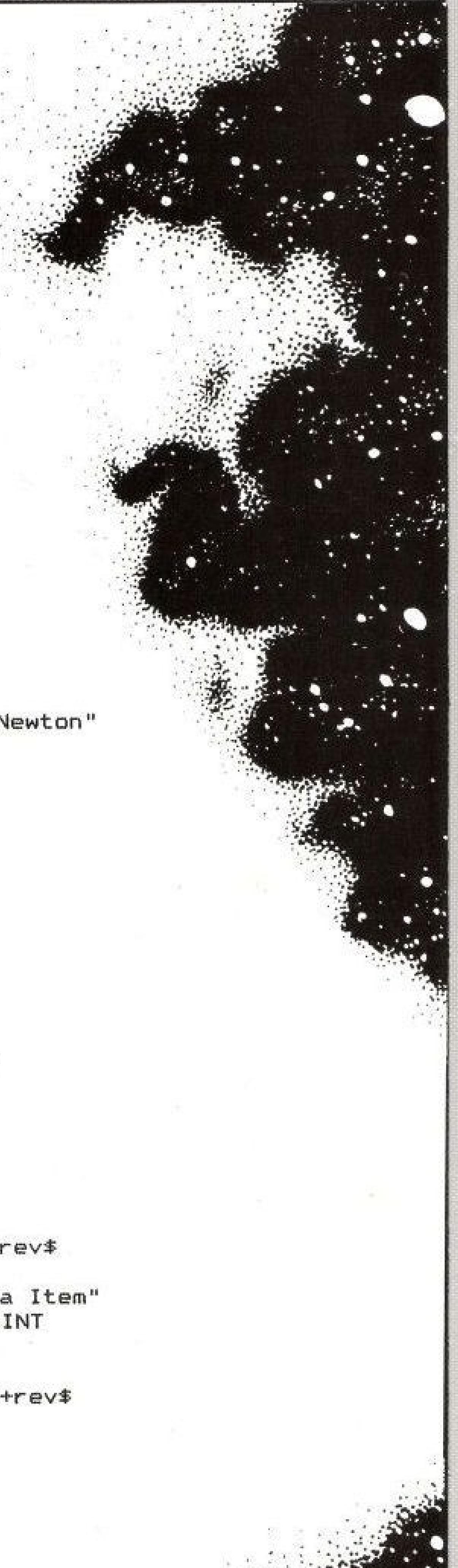
That's about it example wise, so it's back to Nick for a little more about the programs functions.

NH

Just type in listing one, as it appears and run it. If you want to enter your own data or input one of the examples then select option 2. If you wish to use the built in example choose option 1.

By the way the machine code interrupt driven screen saver is printed separately as well as in listing 1. I'm sure many of you will find it useful as a stand alone piece in code. It lives fairly high up in memory but this positioning can be easily altered to suit your own needs. Perhaps you could relocate it in the non-volatile area of RAM around &AF00. You can select option 4 to quite the simulation and resent your machine.

If you discover some really interesting astronomical manoeuvre then why not send in the data. Great fun can be had crashing Halleys comet into the Earth, so why not have a go at plying God with the universe. So until next time its goodbye from Nick, Esaac and Johannes.



```
10 DATA 21,15,90,06,81,0E,00,11
20 DATA 1E,90,CD,E0,BC,C9,21,15
30 DATA 90,CD,E6,BC,C9,00,00,00
40 DATA 00,00,00,00,00,00,3E,17
50 DATA CD,1E,BB,C8,CD,0E,90,0E
60 DATA FF,21,2F,90,CD,13,BD,CD
70 DATA CB,BC,06,0C,21,4C,90,11
80 DATA D0,07,CD,8C,BC,21,00,C0
90 DATA 11,00,40,3E,02,CD,98,BC
100 DATA CD,8F,BC,C7,41,53,54,52
110 DATA 4F,53,43,52,2E,42,49,4E
120 DATA 00,00,00,00,00,00,00,00
130 DATA end
140 add=&9000
150 READ a$:IF a$="end" THEN 180
160 POKE add,VAL("&"+a$):add=add+1
170 GOTO 150
180 REM LET THERE BE LIGHT,(and Gravity)
190 REM By Nick Hutton  @N.C.Hutton 1990
200 CALL &9000
210 RESTORE 430
220 k=0
230 ON BREAK STOP
240 MODE 2
250 PAPER 1:CLS:INK 0,0:INK 1,26:BORDER 26:PEN 0
260 PRINT TAB(32);"Gravity"
270 PRINT
280 PRINT TAB(17);"Created by Nick Hutton and Issac Newton"
290 PRINT
300 WINDOW#1,25,49,5,10:PAPER#1,2:CLS#1
310 WINDOW#2,26,50,6,11:PAPER#2,0:CLS#2
320 PRINT#2,"1....Execute Demo"
330 PRINT#2,"2....Enter Data table"
340 PRINT#2,"3....Plot and Print Data"
350 PRINT#2,"4....Abort Program"
360 WINDOW SWAP 0,3
370 LOCATE 28,20
380 PEN 0:PAPER 1:INPUT"Enter option (1- 4 ";opt%
390 PAPER 0
400 ON opt% GOSUB 420,470,870,860
410 IF opt%>=1 OR opt%<=3 THEN GOTO 240
420 REM demo data
430 DATA 100,12.16,0,40,240,600,0,33,0,40,180,10
440 READ m1,v1,a1,x1,y1,m2,v2,a2,x2,y2,g
450 MODE 1:INK 0,0:INK 1,26:PEN 1:PAPER 0:BORDER 0
460 GOTO 600
470 MODE 1:INK 0,0:INK 1,26:PEN 1:PAPER 0:BORDER 0
480 MODE 1:PRINT TAB(12);rev$+SPACE$(18)+rev$
490 PRINT TAB(9);rev$+" Enter Data for Simulation "+rev$
500 PRINT TAB(12);rev$+SPACE$(18)+rev$
510 LOCATE 14,4:PRINT"     Press Enter After each Data Item"
520 WINDOW 1,40,7,25:PRINT rev$+"First Body"+rev$:PRINT
530 INPUT"MASS     :",m1:INPUT"VELOCITY:",v1
540 INPUT"ANGLE    :",a1:INPUT"X CO-ORD:",x1
550 INPUT"Y CO-ORD:",y1:CLS:PRINT rev$+"Second Body"+rev$
560 PRINT:INPUT"MASS     :",m2:INPUT"VELOCITY:",v2
570 INPUT"ANGLE    :",a2:INPUT"X CO-ORD:",x2
580 INPUT"Y CO-ORD:",y2:CLS:INPUT"GRAVITY :",g
590 MODE 1:PRINT STRING$(40,143):WINDOW 1,40,1,8
600 INK 0,0:INK 1,26:PAPER 0:PEN 1:BORDER 0
610 PRINT rev$+ "Body"," First"," Second"+rev$
620 PRINT"MASS     :",m1,m2:PRINT"VELOCITY:",v1,v2
630 PRINT"ANGLE    :",a1,a2:PRINT"X CO-ORD:",x1,x2
640 PRINT"Y CO-ORD:",y1,y2:PRINT"GRAVITY :",g
650 dt=0.1:a1=a1*PI/180:a2=a2*PI/180:x1=x1+10:x2=x2+10
660 REM U.D.G for planets
670 SYMBOL 255,126,129,129,129,129,129,129,126
680 PLOT 1000,100,1:ORIGIN 0,0,0,639,270,0
690 ORIGIN 0,0,0,639,270,0
700 MOVE x1-8,y1+8:TAG:PRINT CHR$(255)
710 MOVE x2-8,y2+8:PRINT CHR$(255);:TAGOFF
```

```
720 v1x=v1*COS(a1):v2x=v2*COS(a2):v1y=v1*SIN(a1)
730 v2y=v2*SIN(a2):REM ISSAC'S contribution follows
740 fg=g*m1*m2/((x2-x1)*(x2-x1)+(y2-y1)*(y2-y1))
750 IF x2=x1 THEN phi=PI/2:GOTO 770
760 phi=ATN(ABS((y2-y1)/(x2-x1)))
770 f1x=fg*COS(phi)*SGN(x2-x1):f2x=-f1x
780 fgx=fg*SIN(phi)*SGN(y2-y1):f2y=-f1y
790 a1x=f1x/m1:a2x=f2x/m2:s1x=v1x*dt+a1x*dt*dt/2
800 s2x=v2x*dt+a2x*dt*dt/2:v1x=v1x+a1x*dt:v2x=v2x+a2x*dt
810 a1y=f1y/m1:a2y=f2y/m2:s1y=v1y*dt+a1y*dt*dt/2
820 s2y=v2y*dt+a2y*dt*dt/2:v1y=v1y+a1y*dt:v2y=v2y+a2y*dt
830 PLOT x1,y1,3:PLOT x2,y2,2:IF k<>1 THEN 840 ELSE:PEN 3: PRINT "RED X,Y=":PRIN
T x1,y1:CALL &BB18:PEN 2:PRINT "BLUE X,Y=":PRINT x2,
y2:PEN 1
840 x1=x1+s1x:x2=x2+s2x:y1=y1+s1y:y2=y2+s2y
850 GOTO 740
860 CALL &BB18:CALL 0
870 k=1:GOTO 470
```

```
CREATE_EVENT      EQU &BCE0
DELETE_EVENT      EQU &BCE6
TEST_KEY          EQU &BB1E
LOAD_RAM          EQU &BD13
WAKE_UP_DISC_ROM EQU &BCCB
MC_OPENOUT        EQU &BC8C
WRITE_FILE        EQU &BC98
MC_CLOSEOUT       EQU &BC8F

org &9000
ld hl,event_block       ;address of block
ld b,&81                ;event class
ld c,0                  ;ROM selection address
ld de,event_routine     ;address of routine
call CREATE_EVENT       ;Add an event to the list
ret                     ;using the data specified

switch_off_event
ld hl,event_block       ;address of block to be
call DELETE_EVENT       ;deleted,from the list
ret

event_block
defs 9

event_routine
ld a,23                 ;we want to test for the
call TEST_KEY           ;CTRL key, number 26
ret z

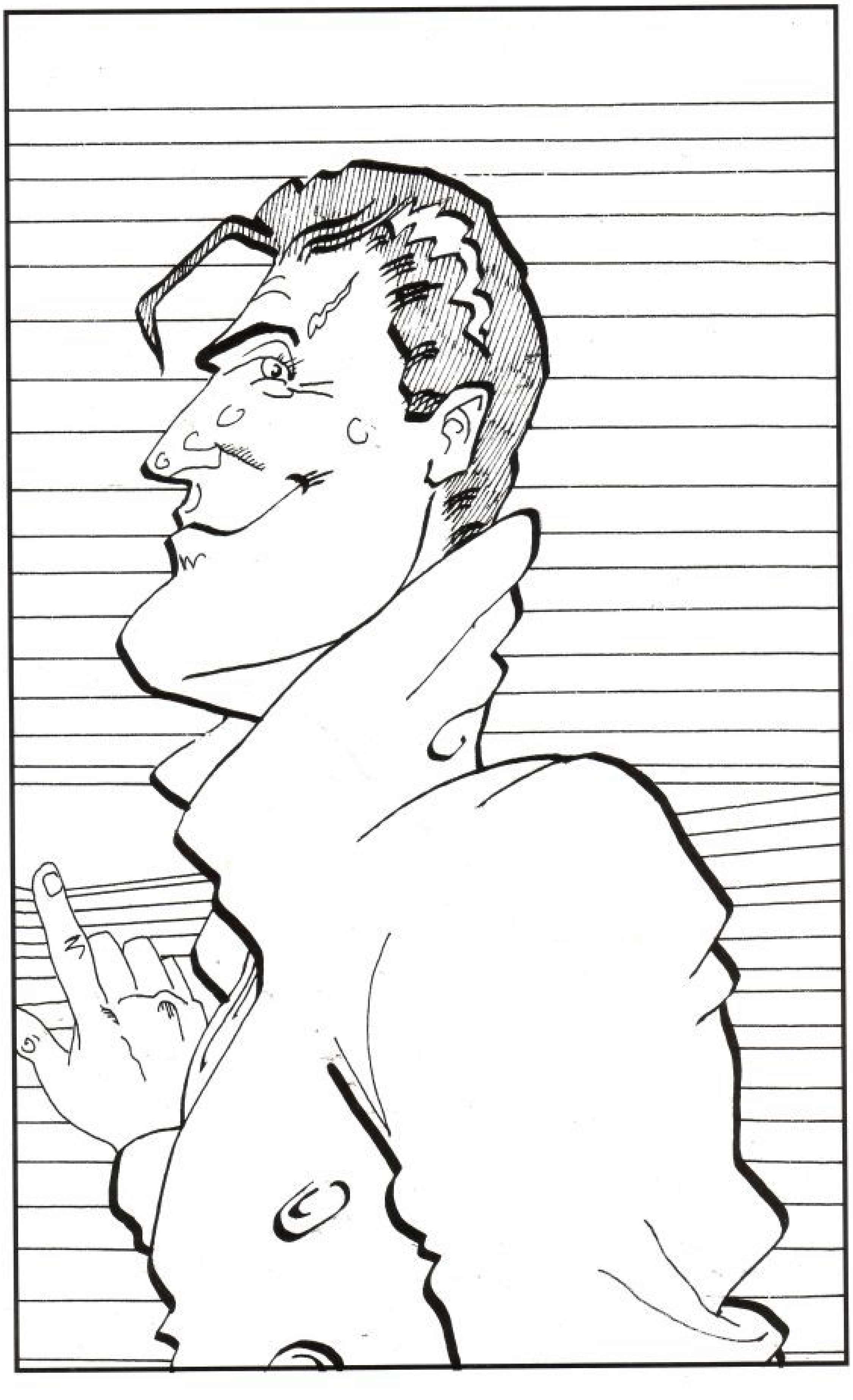
call switch_off_event
ld c,&ff
ld hl,run_prog          ;address of routine to call
call LOAD_RAM           ;to load the program

run_prog
call WAKE_UP_DISC_ROM ;we must initialise the disc
ld b,12                 ;ROM before we attempt to use it
ld hl,filename          ;address of filename to use
ld de,2000              ;address of next file buffer
call MC_OPENOUT
ld hl,&c000             ;address to write from
ld de,&4000             ;number of bytes to write
ld a,2                  ;type of file
call WRITE_FILE
call MC_CLOSEOUT
RST 0                   ;very chilly boot

filename
defb "ASTROSCR.BIN"     ;insert any name you like
```



Lead on Macduff



Gallant Gordon, denizen of BBS systems everywhere and generally all round nice guy, tips back his fedora and pays some attention to the RS232C interface.

Ah, the season of fruits and mellow mistfullness is once again upon yours truly as he sits at the keyboard pounding out pearls of wisdom in purple prose. It's a little known fact that all of the words you read in this section of your fave magette get to you courtesy of BT's smellybone network - well, I mean, you wouldn't expect anything else, now would you. Thing is, though, that at this time of year, for reasons that I can't fathom out, the smellybone lines seem to get a bit more crackly and hissy than at other times. Maybe it's got something to do with underground cables contracting as the temperatures fall. Maybe the satellite links get all messed up by Solar activity as the autumnal equinox approaches its zenith (ooer - almost poetical, that!) Whatever it is, October/November nearly always sees me messing about with the setups I've got to tweak them a bit.

Now, unless they die, RS232C interface boxes rarely get affected by atmospheric variables (assuming you don't boil a kettle near them, of course). Neither, for that matter, ought your cables to be affected. BUT - and it's a big but - if anything DOES go wrong with your cabling, or if you need to rehash a lead to sit better with a new modem, could you wield the soldering iron and get on with the task in hand??

No?? Well, if you knew a bit more about RS232C interfaces and what they are, could you manage to make a lead up then?? You could? Oh, good - I thought I was going to to have nothing to write about there for a moment!

OK, we'll go from the beginning. The simplest way to get a signal from one place to another (electrically, that is) is much the same as the way your hi-fi drives one loudspeaker. It needs two

wires - one 'live' and one 'earth' - just like a bulb in a torch needs a live and an earth.

Now, that's fine for one way traffic, but, an RS232C port is designed to allow two way traffic - it's absolutely no good being able to send data to a modem if you can't receive any data back from it. Thus, we need a third wire. Now we have one wire that acts as earth - it's called 'SIGNAL GROUND', one for transmitting data - 'TX', and one for receiving data - 'RX'. (The 'TX' and 'RX' come from radio speak for transmit and receive). The usual assignments for a DTE RS232C (That's Data Terminal Equipment - the computer end, in other words) are TX on pin 2, and RX on pin 3. Pin?? Yes, the bog standard RS232C port has 25 pins, each of which has an assignment. Don't worry, though, we don't need anywhere near that many! Signal Ground can normally be found on pin 7.

OK, with those three wires, we could actually set up a link quite nicely, if a modem (or a printer, for that matter) would manage with just them. Unfortunately, most don't - but we're jumping ahead a bit.

However, it WOULD be possible to get two computers talking to each other, but we'd have to put the old grey matter to work first. Remember, we called pin 3 RX - it receives. What it receives is transmitted by pin 2 (TX) on the other computer. Thus, we'd need to connect pin 2 on one end to pin 3 on the other, and vicky verky. That's called a NULL MODEM configuration - 'cos it cuts the modem out of the equation!

Back to what we were talking about - we'll consider a full null modem later. Now, as I said, we don't need to use all 25 pins on the interface. In fact, the most you usually need is eight or nine, chosen from 1 to 8, and pin 20. We'll look at each in turn.

Pin 1 > PROTECTIVE GROUND

This is where any shield the cable you use gets connected. It doesn't carry any signal at all, but it can act as a shield to stop unwanted radiations affecting the signals you DO want, or to stop any from straying to other things. You can ignore it quite safely.

Pin 2 > TX

We've already discussed this - it carries the data you want to TRANSMIT.

Pin 3 > RX

The reverse of pin 2 - it carries information TO the port - it receives.

Pin 4 > RTS

RTS stands for Ready To Send. If you were throwing eggs for a mate to catch (people do such things, I'm told), you wouldn't just chuck one and hope he realised that you had. You'd let him know that an egg was about to hurtle towards him, either by shouting, or waving an arm, or sending another person to tell him. RTS tells the other end that the 'pooter end is actually ready to do something useful. It can be either on, or off - if it's on, it's ready. If it's off, it's not!

Pin 5 > CTS

CTS stands for Clear To Send, and is where the RS232C can be told that everything is fine, it can actually send some data. It could be said to be the mate that's catching the egg in our example above.

Pin 6 > DSR

DSR is Data Set Ready. It's a lot like RTS. Nuff said

Pin 7 > GND

GND or Signal Ground is exactly like the Neutral in a three pin plug. It's zero volts, and that about sums it up - it doesn't do anything, but you can't do without it. No matter what kind of lead you make, you MUST have pin 7 connected to the pin 7 at the other end.

Pin 8 > DCD

Data Carrier Detect is a clever bit of stuff. You'll already know that when you dial a BBS up, you hear all sorts of whistles and shrieks, and that at some point, both modems decide that they're actually going to get on with the business of talking to each other, and so establish a carrier for the signals (don't worry, we'll discuss this in another article - just trust me for the moment). Well, the DCD line gets turned on when this happens (no dubious jokes here folks - I know some of you are fond of comms, but you can take things too far!), and certain software can read it, and decide to carry on communicating. You'll often see an indicator light with 'CD' under it light up once the modems go quiet - it lights up when DCD is 'asserted'.

Pin 20 > DTR

DTR is the acronym for Data Terminal Ready. This is another clever bit. Suppose you've got some clever software, or a slow cassette drive, and you're running a fast modem. There will be times when Arnold needs to turn his attention to actually doing something with the data he's receiving - it might be saving to tape, or performing some calculations with it, or whatever. Either way, he can't digest any more. If he doesn't tell the modem that he's full, the silly thing will keep pumping more bytes into his port, and he'll just ignore them - chuck them out, in effect.

If DTR is turned on (oh, alright, SWITCHED on), whatever is at the other end knows it can keep squirting info at him. If he turns it off, 'tother end knows he's chewing what he's already got, and waits around until he can accept some more. In our egg-chucking example, it's like the catcher telling you he's got a fly in his eye, and asking you to wait a bit before you chuck the egg.

Now, as you can see from that little lot, there are two types of signals associated with the RS232C interface - DATA and CONTROL signals. The DATA signals actually carry information that you supply (or the other end). CONTROL signals help you transfer it without losing any into the ether - they control the flow of data.

So, if that's an RS232C interface, where does each pin connect to? Well, there are two kinds of port to the interface. One we've already mentioned - it's the DTE - Data Terminal Equipment, and it's the DTEpin assignments we've listed. The other is called DCE - Data Communications Equipment, and it jumbles the pin assignments about a wee bit.

So, RTS talks to CTS, DTR talks to DSR, TX talks to RX, and the rest stay as they are. This table might help.

Table 1

DTE	Name	DCE	Pin		Pin 1	Protective
GND	1 2	TX	3 3	RX	2 4	RTS
5 5	CTS	4 6	DSR	20 7	GND	7 8
DCD	8 20	DTR	6			

In a DTE to DCE cable, because the control signals are transposed, you just wire pin 2 to 2, 3 to 3, and so on, it's very straightforward.

In a null modem lead, use the table above to sort out which pin goes to which - forget the names, and wire 2 to 3, 3 to 2, 4 to 5, and so on.

I think that's enough for now, next time, we'll look at some problems you might come across in cabling up a particular modem to your RS232C, when all the signals you need aren't actually provided. There are some nice little cheats you can use!! Standards - don't you just love em??

Till next month, Live Long and Prosper (isn't the Second Generation Naff?? Bring back Spock and Bones, I say!!)


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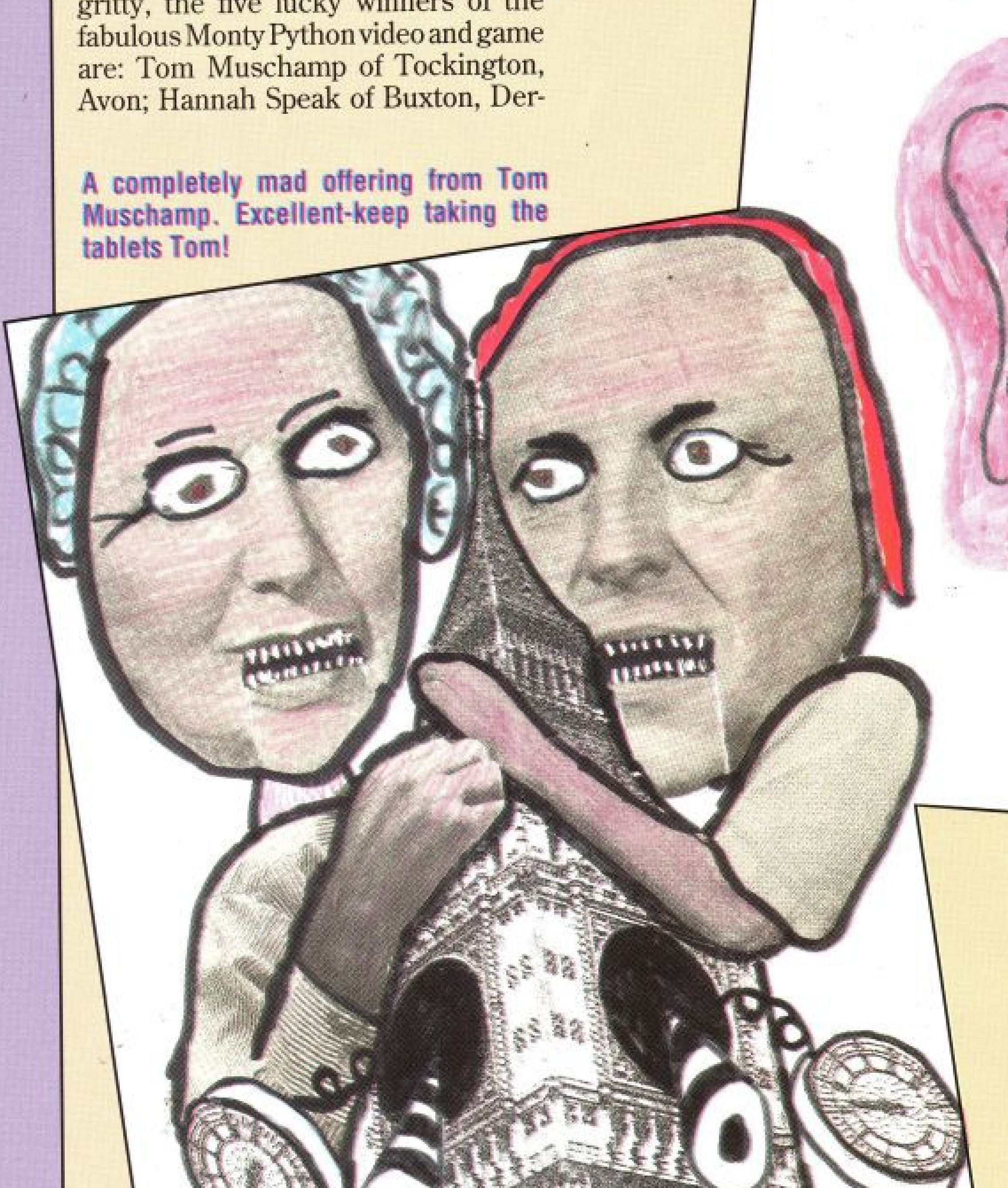
Monty Madness

Do you remember back in October, when we asked you to give us your rendition of Big Ben as seen through wacky Python Terry Gilliam's eyes?

You bet! Well you should have seen some of the ideas we had in our jam-packed mailbag, they were certainly zany enough for us Python lovers.

Anyway, to get down to the nitty-gritty, the five lucky winners of the fabulous Monty Python video and game are: Tom Muschamp of Tockington, Avon; Hannah Speak of Buxton, Derbyshire; Charlotte Davies of Hinstock, Shropshire; Stephen Lamport of Salfords, Surrey and Gareth Evans of Chelmsford, Essex, for his wonderful upside down version.

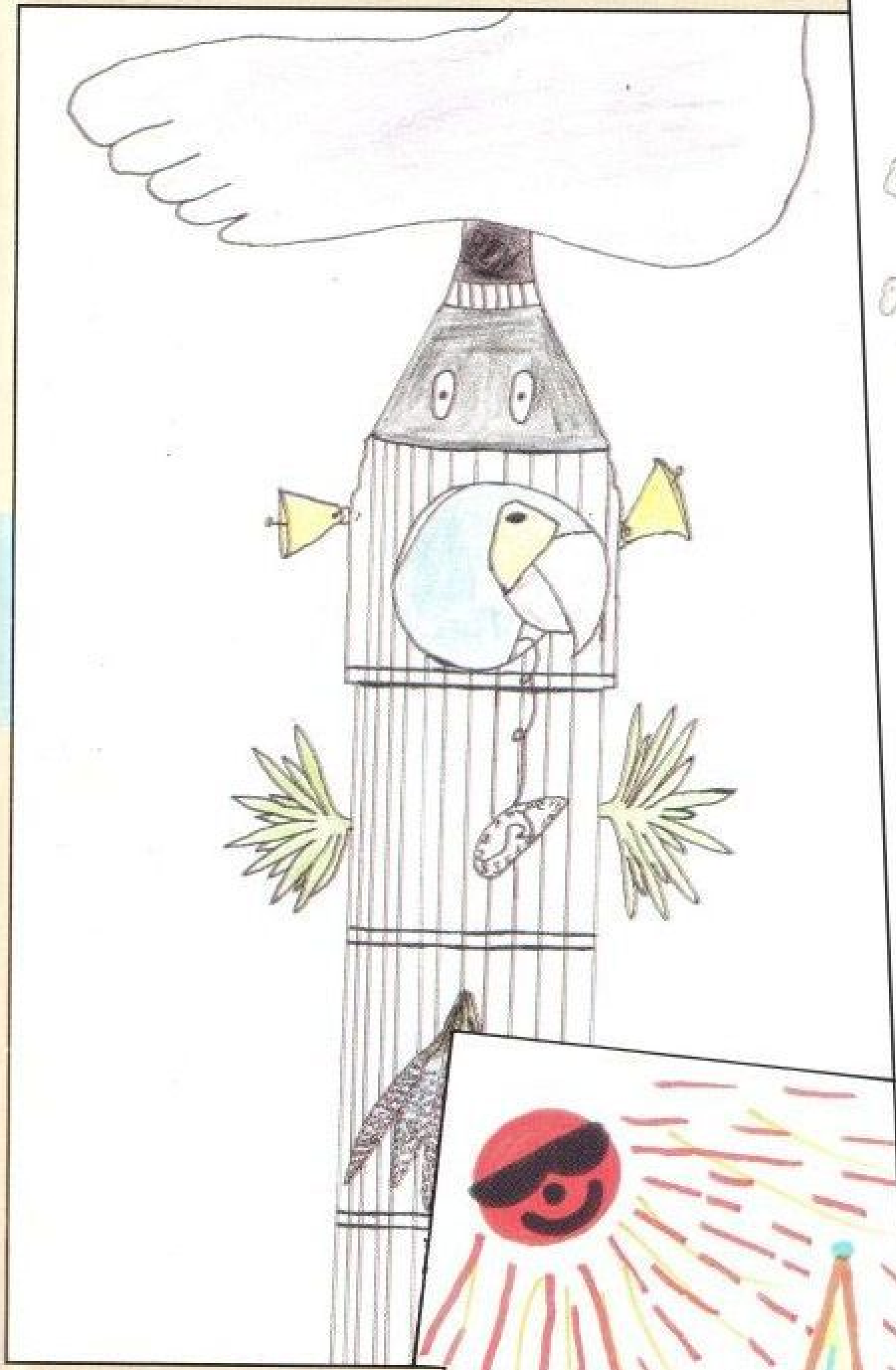
Sorry you couldn't all be winners, the quality of the artwork we received was certainly good enough, but unfortunately, we just haven't got enough prizes to go round. Keep trying and you never know your luck, you're bound to get your name in the hallowed pages of ACU before too long.

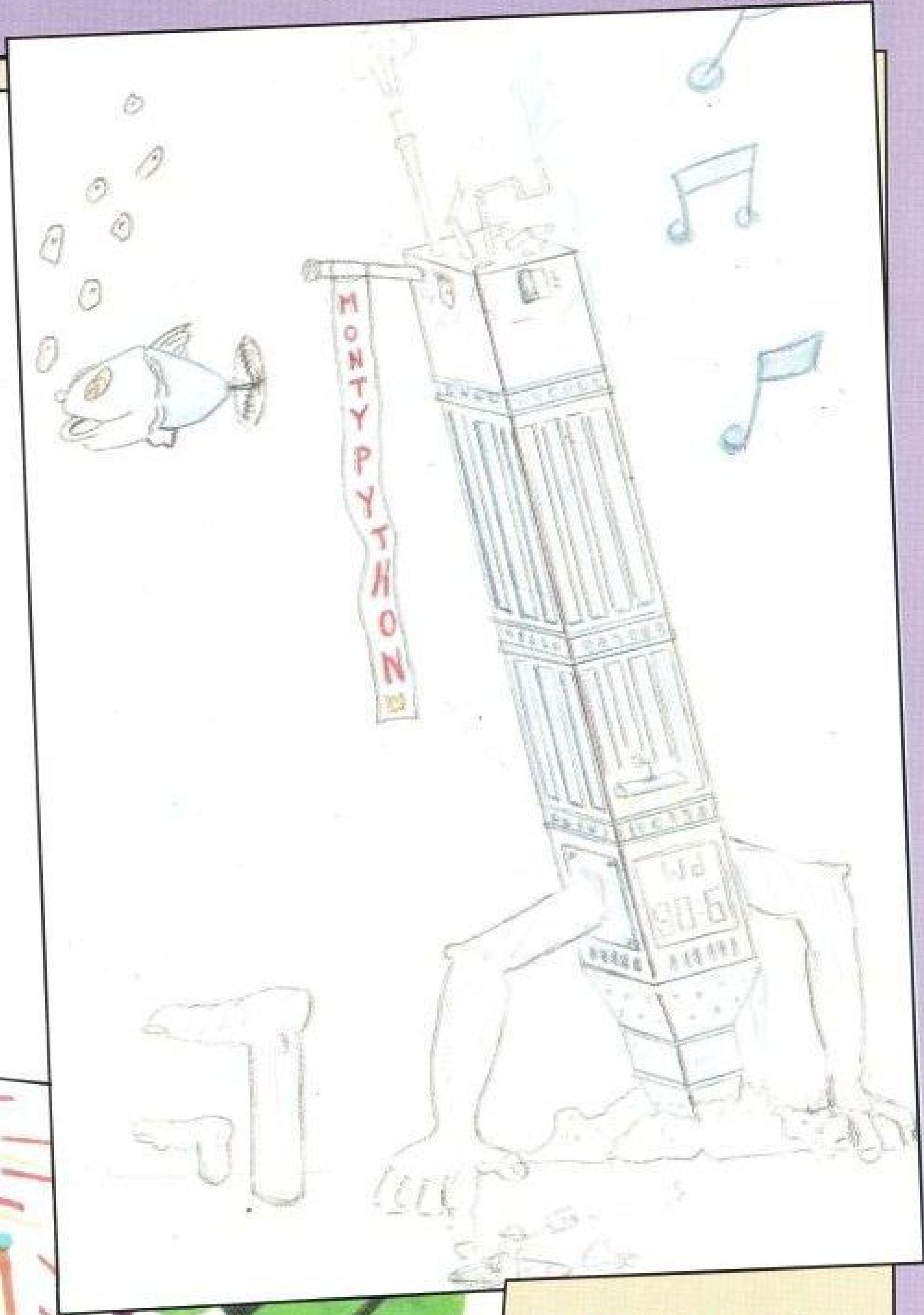


A completely mad offering from Tom Muschamp. Excellent-keep taking the tablets Tom!



I'm sure I've seen those ears somewhere before Charlotte. Oops, sorry Charles Your Highness.

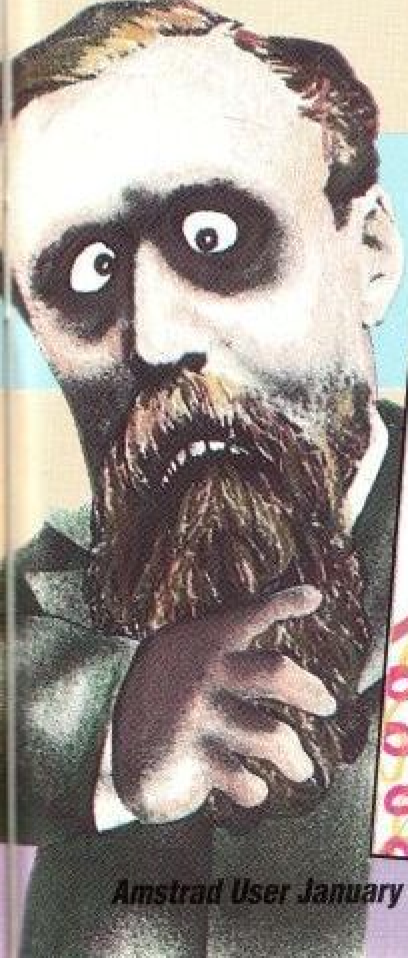




A completely marvellous, round the twist view from Gareth Evans.

Are you sure that parrot's only resting Stephen?





Hannah Speak's gone completely cuckoo over this one.

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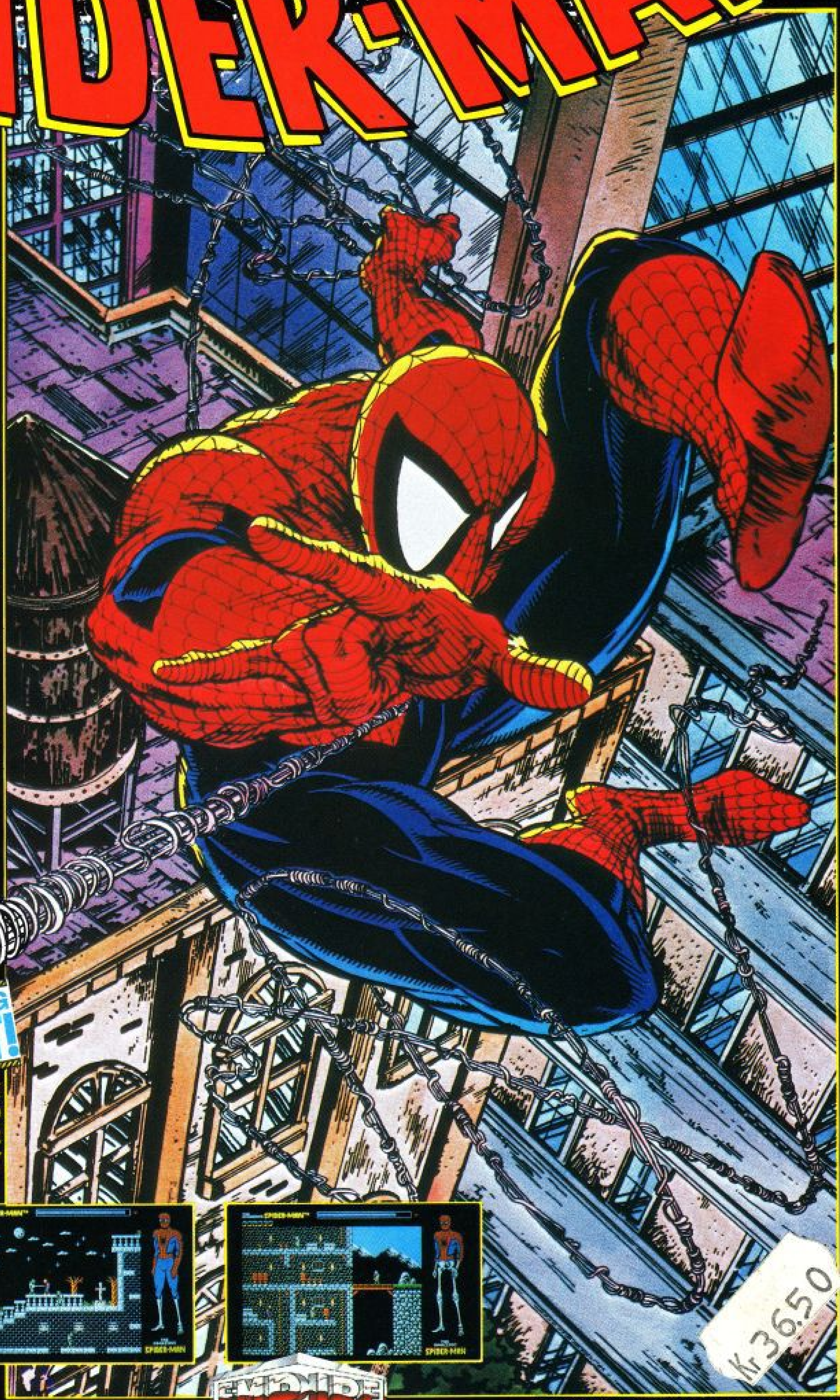
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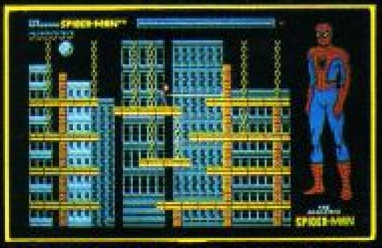
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